A TOXICITY STUDY ON

"PATTAI CHOORANAM"

Dissertation Submitted To

THE TAMILNADU Dr.M.G.R MEDICAL UNIVERSITY

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For the Partial fulfillment in Awarding the Degree of

DOCTOR OF MEDICINE (SIDDHA)

(Branch – VI, Nanju Noolum Maruthuva Neethi Noolum)

Department of Nanju Noolum Maruthuva Neethi Noolum

Government Siddha Medical College

Palayamkottai – 627 002

OCTOBER – 2019

GOVT. SIDDHA MEDICAL COLLEGE, PALAYAMKOTTAI

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation entitled "**A Toxicity Study on PATTAI CHOORANAM**" is a bonafide and genuine research work carried out by me under the guidance of **Dr. M. P. ABDUL KADER JEYLANI**, **M.D(s).,** Professor, Post Graduate Department of Nanju Noolum Maruthuva Neethi Noolum, Govt.Siddha Medical College, Palayamkottai, and the dissertation has not formed the basis for the award of any Degree, Diploma, Fellowship or other similar title.

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Place: Palayamkottai **Dr. P. KOKILA**

CERTIFICATE

This is to certify that the dissertation entitled **"A TOXICITY STUDY ON PATTAI CHOORANAM"** is a bonafide work done by **Dr. P. KOKILA (Reg.No. 321616004)** Govt. Siddha Medical College, Palayamkotai in partial fulfillment of the university rules and regulations for award for **MD(s) Nanju Noolum Maruthuva Neethi Noolum** under my guidance and supervision during the academic year 2016-2019.

Name and signature of the Guide :

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Name and signature of the Principal:

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The Tamil Nadu Dr. M.G.R. Medical University

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This certificate is awarded to Dr/~~Mr/Mrs~~....P. KOKILA.....

for participating as ~~Resource Person~~ / Delegate in the XXIII Workshop on

"RESEARCH METHODOLOGY & BIOSTATISTICS"

Organized by the Department of Siddha,

The Tamil Nadu Dr. M.G.R. Medical University from 6th to 10th March 2017.

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GOVERNMENT SIDDHA MEDICAL COLLEGE

PALAYAMKOTTAI

CERTIFICATE OF BOTANICAL AUTHENTICITY

Certified the following plants drug used in siddha formulation (Internal) **"PATTAI CHOORANAM"** for 21 vagai pramegangal, Soolai, Kiranthi, Megavooral, Megavayu, taken up for post graduate dissertation studies by Dr.P.KOKILA, PG Scholar, MD siddha, Department of Nanju Noolum Maruthuva Neethi Noolum are correctly identified and authenticated through visual inspection/Organoleptic characters/Experience and Training Morphology, Microscopically and Taxonomical methods.

INGREDIENTS OF PATTAI CHOORANAM:

S.NO	DRUG	BOTANICAL NAME	FAMILY	PART USED
1	Parangipattai	Smilax china	Liliaceae	Tuber
2	Sathikai	Myristica fragrans	Myristicaceae	Seeds
3	Sathipathiri	Myristica fragrans	Myristicaceae	Aril
4	Lavangam	Syzygium aromaticum	Myrtaceae	Dried flower buds
5	Sirunagapoo	Mesua ferrea	Guttiferae	Flower buds
6	Amukkara kizhangu	Withania somnifera	Solanaceae	Root tuber
7	Kodiveli Verpattai	Plumbago zeylanica	Plumbaginaceae	Root bark
8	Sadamanjil	Nardostachys jatamansi	valerianaceae	Root

STATION: Palayamkottai

DATE: 12.2.19.

12/2/19

AUTHORIZED SIGNATURE

Dr. S. SUTHA, M.Sc.,M.Ed.,Ph.D.,
Associate Professor
Dept. of Medicinal Botany
Govt. Siddha Medical College
Palayamkottai, Tirunelveli - 2.

GOVERNMENT SIDDHA MEDICAL COLLEGE

Palayamkottai

CERTIFICATE OF MINERAL AUTHENTICATION

Certificat the following that MINERAL (Thathu) drug used in siddha formulation (internal) PATTAI CHOORANAM for 21 vagai pramegangal, Soolai, Kiranthi, Megavooral, Megavayu taken up for post graduation dissertation studies by Dr. P.Kokila PG scholar of MD Siddha, Department of Toxicology have selected the Raw drug (Minarals) and has been authenticated through Geological method.

Sl.No	Drug	English Name	Scientific Name
1.	Nellikai Ganthagam	Sulphur	Sulphur
2.	Pachai Karpooram	Borneo Camphor	Chinnamomum Camphora

Place: Palayamkottai

Date: 24.12.2018.

24/12/18

Authorized Signature

DR. G. ESSAKKY PANDIAN

Lecturer

NANDHACOLLEGE OF PHARMACY, ERODE - 52

Committee for the Purpose of control and Supervision of Experiments on Animals (CPCSEA)
Institutional Animal Ethics Committee (IAEC)
Reg No: 688 /PO/Re/S/02/CPCSEA

CERTIFICATE

Title of the project	:	A.TOXICITY STUDY ON PATTAI CHOORANAM
Proposal Number	:	NCP/IAEC/2018-19/22
Date received after modification (if any)	:	---
Date received after second modification	:	---
Approval date	:	27.12.2018
Species & Number of animals sanctioned	:	WISTER ALBINO RAT/42
Expiry date (Termination of the Project)	:	05.04.2019
Name of the IAEC / CPCSEA Nominee	:	Dr. C. Gunasekaran

Dr. T. Sivakumar
Chairperson

Dr. C. Gunasekaran
CPCSEA Main Nominee

Dr. V. Gowthaman
Scientist From Outside the Institute

Dr. Ganesan Arihara Sivakumar
Socially Aware Nominee

Dr. R.Palanisamy
Veterinarian

Dr. S. Sengottuvelu
Member Secretary & Animal house Incharge

Dr. S. HajaSherief
Biological Scientist

Dr. K. Abdhul
Scientist From Different Discipline

GOVERNMENT SIDDHA MEDICAL COLLEGE& HOSPITAL
PALAYAMKOTTAI

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This Certifies that

Dr. P. Kokila

has participated in Continuing Medical Education on "**AYUSH External Therapies-II**" held at GSMCH, Palayamkottai on Dec, 4 2018

Dr. A.S.Poongodi Kanthimathi MD (s).,
Head - Dept. of Sirappu Maruthuvam

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Principal

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Scope of Clinical Practice in Siddha System of Medicine

This certificate is proudly presented to Dr/~~Mr/Mrs/Ms~~.....P. KOKILA.....

for Participating / ~~Presenting~~ ~~Poster~~ ~~entitled~~".....—.....

....." in the **Pre – Siddha Day Seminar on** "Scope of Clinical Practice in Siddha System of Medicine" organized by Siddha Clinical Research Unit, Palayamkottai, a peripheral unit of Central Council for Research in Siddha(CCRS), Chennai with the support of Ministry of AYUSH held on 19th December 2018 at Govt. Siddha Medical College Auditorium, Palayamkottai.

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Government Siddha Medical College campus, Palayamkottai
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ABBREVIATIONS

PC	PATTAI CHOORANAM
No.	Number
Mg	Milligram
Kg	Kilogram
LD_{50}	Lethal $Dose_{50}$
ED_{50}	Effective $Dose_{50}$
p.o	peros
ML	Milliliter
%	percentage
R&D	Research and Development
EDTA	Ethylene Diamine Tetra Acetic Acid
M	Male
g%	Gram percentage
g	Gram
NOAEL	No-Observed-Adverse-Effect-Level
OECD	Organization of Economic Co-operation and Development
CPCSEA	Committee for the Purpose of Control and Supervision of Experiments on Animals
FTIR	Fourier Transform – Infra Red Spectroscopy
SEM	Scanning Electron Microscopy
ICP-OES	Inductively Coupled Plasma Optical Emission-Spectrometry
LD	Low Dose
MD	Middle Dose
HD	High Dose
BDL	Below Detection Limit

1. INTRODUCTION

The science of medicine must have originated with the primitive and foremost man as it is of fundamental importance to his happiness, well being and survival and then must have developed all along ever since the dawn of civilization. In this manner, Siddha system of medicine which forms the essence of accumulated wisdom of the ancient Dravidian civilization in the science of curing the ills and its one of the 64 Art forms of Tamil culture. This art of healing was preached practiced and perfected by the Siddhars and hence came to be known as the Siddha System of Medicines.

This system of medicine recognizes the fact the human organs are only the material and the bodily representatives of invisible energies or activities that pervade and circulate the whole cosmic system. In siddha system of medicine, the physiological function in the human system is mediated by three substances i) Vatham ii) Pitham iii) Kapam which are made up of the five elements (Bhutas) i) Mann ii) Neer iii) Thee iv) Vayu and Akasam. If food and work are either excessive or deficient, the three things enumerated by medical writers, Vatha, Pitha, Kapha will cause disease.

Siddha system of medicine performed in wide range of curation of all age groups such as children, adolescents, teenages, adult and elders. And all type of diseases condition and Acute or chronic disease condition also.

Nowadays, World health's status also opens eyes towards the siddha system of medicine. Because siddha medicine deals with all diseases such as life style disorders and Autoimmune diseases etc. In this view sexual transmitted diseases and debilitatory diseases also cured by the siddha medicines by many years. Therefore this dissertation drug selected to cure the debilitatory disease as 'Pramegam' by the pattai chooranam. This medicine's ingredients were obtained good pharmacological action to cure debilitatory disease.

Hence I belonged to specialize in toxicology field. Therefore this research was to be done toxicological study on pattai chooranam. Because this dissertation will satisfied world challenge diseases with siddha medicine and its safety profile by toxicological study to explore the world successfully.

The research projects undertaken are designed to make the Siddha therapy more acceptable by establishing the efficacy of the system with the aid of modern parameters for my partially completed the Doctor of Medicine (MD) Post graduation in Toxicology special field respectively.

2. AIM AND OBJECTIVES

AIM

To evaluate the toxicological study on Siddha Drug- Pattai chooranam

OBJECTIVES

- To prepare the Pattai Chooranam using traditional literature sources.
- To characterize the prepared Pattai Chooranam using various analytical techniques.
- To assess the safety of Pattai Chooranam in acute and subacute administration through animal experiments.

REVIEW OF LITERATURE

SIDDHA ASPECT

பறங்கிப்பட்டை

வேறு பெயர்:

மதுஸ்மிகம், மதுஸ்மீகி, சீனப்பட்டை, பறங்கிச்சக்கை.

பயன்படும் உறுப்பு: கிழங்கு.

சுவை : இனிப்பு.

தன்மை : தட்பம்.

பிரிவு : இனிப்பு.

செய்கை:

உடற்றேற்றி : Alterative.

மேகப்பிணிவிலக்கி : Antisyphilitic.

காமம்பெருக்கி : Aphrodisiac.

தூய்மையாக்கி : Depurative.

குணம்:

இதனால் நீர்வேட்கை, பற்பல வளிநோய், புண், பிளவை, நீரிழிவு, கடிவிடம், சிரங்கு, மூலமுளை, முடவாதம், குறைநோய், ஐயம், மகரந்தப்புண், வாந்தி இவை நீங்கும். ஆண்மை உண்டாம்.

தாகம் பலவாதந் தாதுநட்டம் புண்பிளவை
மேகங் கடிகிரந்தி வீழ்மூலந்-தேகமுடன்
குட்டை பகந்தமேற் கொள்வமனம் போம்பறங்கிப்
பட்டையினை யுச்சரித்துப் பார்.

- தேரையர் குணவாகடம்.

வழக்கு:

இதைப் பொடி செய்தேனும், குடிநீரிட்டேனும் கொடுத்துவர மேற்கண்ட நோய்கள் போம். **குணபாடம் மூலிகை வகுப்பு – முதற் பாகம், ப.எண்: 651.**

பரங்கிப்பட்டை:

துன்பரங்கிப் பட்டைக்குச் சொன்னார் மதுஸ்மிகியாம்
மன்மதுரத் தோடுதுவர் வார்குணமே – பின்வாதம்
வெப்பின் கயமார்பின் மேல்வலியும் ஓடியே
தப்பிக் கயம்புகுமே தான்.

வேறு பெயர் : மதுஸ்மிகி.

சுவை : இனிப்பு, துவர்ப்பு.

குணம் : வாதம், சுரம், மார்புவலி இவை தீரும்.

அகஸ்தியர் மணி 4000 என்னும் வைத்திய சிந்தாமணி வெண்பா 4000 - 2ம் பாகம், ப.எண்: 287.

பறங்கிப்பட்டைச் சூரணம்:

இதனால் புண், கரப்பான், சூலை, வெட்டை, மந்தம், அதிகழிச்சல், கிராணி, உப்பிசம், வயிற்றிரைச்சல் தீரும். **அகஸ்தியர் காவியம் 1,500.**

பறங்கிப்பட்டை இரசாயனம்:

இதனால் கிரந்தி, புண், சூலை, கண்டமாலை, வளிநோய், வெள்ளை, கொருக்கு, ஐய நோய் ஆகிய 96-ம் நீங்கும்.

அகஸ்தியர் இரத்தினச் சுருக்கம்.

பறங்கிப்பட்டை இலேகியம்:

நாளொன்றுக்கு இரண்டு வேளை தான்றிக்காயளவு நாற்பது நாள் கொள்ள, மேற்கூறிய நோய்கள் எல்லாம் போம்.

அகஸ்தியர் காவியம் 1,500.

பறங்கிப்பட்டை பதங்கம்:

அளவு:

வெருகடியளவு இரண்டு வேளை, ஒருமண்டலம் (48 நாள்கள்) கொள்ளவும்.

தீரும் நோய்கள்:

கரப்பான், கிரந்தி, வெட்டை, குட்டம், இருமல், ஈளை, மேகம், சூலை, கிராணி, அதிசாரம், சயம், காசம், காந்தல், எரிவு இவை தீரும்

அகத்தியர் வைத்திய காவியம் 1,500, ப.எண்: 781.

குக்கிலாதி வடகம்:

அளவு:

சுண்டைக்காயளவு இரண்டு உருண்டை, காலை மாலை இருவேளை மூன்று நாள் கொடுக்கவும்.

தீரும் நோய்கள்:

அரையாப்பு, பவுத்திரம், கரப்பான், கிரந்தி, சூலை, பிளவை, சூசிகவாயு, வீக்கம், புண்கள், கரடுமுரடுகளி, சூலைக்கட்டு, மேகவகைகள், கைச்சூலை, வாய்ச்சூலை, காசம், குட்டம் போன்றவை தீரும்.

துணை மருந்து:

பனைவெல்லம்.

பத்தியம்:

மருந்துண்ட ஏழு நாளுக்குப்பின் ஒன்பதாம்நாள் தலையில் நல்லெண்ணெய் தேய்த்து, ஒருநாள் விட்டு ஒருநாள் முழுகவும். பன்றி, ஆடு, பச்சைமீன், பூசணிக்காய், உளுந்து இவை நீக்கவும்.

அகத்தியர் வைத்திய காவியம் - 1500, ப.எண்:824-825.

சூலைக்குப் பறங்கிப்பட்டைப் பிட்டு:

தீரும் நோய்கள்:

8 நாட்களுக்குள் சூலை நோய், புண்கள் முதலானவை நீங்கும்.

அகத்தியர் இரண்டாயிரம், ப.எண்:170.

கந்தகம்

வேறுபெயர்கள்

காரிழையின் நாதம், பரை வீரியம், அதீதப்பிரகாசம், பீஜம், செல்விவிந்து, சக்தி, சத்திபீசம், செந்தூரத்தாதி, தனம், தேவியுரம், நாதம், நாற்றம், பரை நாதம், பொன்வர்ணி, இரச சுரோணிதம்.

பாடாணங்கள் அறுபத்து நான்கில், பிறப்புக் கந்தகம், வைப்புக் கந்தகம், கோழித்தலைக் கெந்தி வைப்பு, வாணகெந்தி வைப்பு என்று நான்கு பாடாணங்கள், கூறப்பட்டுள்ளன.

நான்கு வகை சாதி அவற்றின் நிறம் மற்றும் பலன்கள்:

- ✓ வெண்மை நிறத்தையுடையது; எல்லா நோய்களையும் தீர்க்கும்.
- ✓ கிளி மூக்குச் சிவப்பு நிறத்தையுடையது. நவலோகத்தை ஏமமாக்கும்
- ✓ பொன்மை நிறமுடையது. குற்றமற்ற நெல்லிக்காய் போன்று இருக்கும். சூதகத்தோடு உறவாகிச் சுத்தமாய் இருக்கும்.
- ✓ காகத்தின் நிறத்தையுடையது. அகப்படாது. அகப்பட்டால் நரை திரைகள் அற்றுப்போம்.

சுவை : கைப்பு, துவர்ப்பு.

வீரியம் : உஷ்ண வீரியம்

பிரிவு : கார்ப்பு

செய்கை:

பித்தநீரை அதிகப்படுத்தும், மலமிளக்கி, உடல்தேற்றி, வியர்வைப்பெருக்கி, கிருமிநாசினி.

குணம்:

சிறிய அளவில் கந்தகத்தை உள்ளுக்கு அருந்த அ.்.து உடம்பில் சேர்ந்து வியர்வை, பால், சிறுநீர் இவற்றின் வாயிலாக வெளிப்படுவதைக் காணலாம். தோல், அசுகங்களின் சளிச் சவ்விலுள்ள கோளங்களின் சுரப்பை அதிகப்படுத்தும். விரேகியில் சிறப்பாகச் செயல்பட்டு சுரப்பை அதிகப்படுத்தும். கந்தகத்தை அதிக அளவில் அருந்தப் பேதியை உண்டு பண்ணும்.

பொதுக்குணம்:

நெல்லிக்காய்க் கந்திக்கு நீள்பதினெண் குட்டமந்தம்
வல்லை கவிசைகுன்ம வாயுகண்ணோய் - பொல்லா
விடக்கடிவன் மேகநோய் வீறுசுரம் பேதி
திடக்கிரக ணீகபம்போந் தேர்.

பொருள்:

நெல்லிக்காய்க் கந்தகத்தினால், பதினெண்குட்டம், மந்தம், கல்லீரல் வீக்கம், பெருவயிறு வகைகளுள் ஒன்றாகிய கவிசை, குன்மவாயு, கண்ணோய்கள், கொடுமையைச் செய்கின்ற விடக்கடிகள், நாட்பட்ட மேகநோய்கள், வாத சுரம், பேதி, நாட்பட்ட கிரகணி, கபம் முதலியன நீங்கும்.

கந்தகம், தாய் மகவை வளர்ப்பது போல நோய்களின் வெப்பத்தை மாற்றி உடம்பைத் தேற்றுவிக்கும் என்பதை

மாதர் மகவை வளர்ப்பதுபோ லேயுடம்பை
யாதரவா கத்தேற்றி யாக்கையினால் - மீதாக
மேவி யடர்நோயின் வெப்பத்தை மாற்றுதலாற்
றேவியுர மென்பதுடல் தேர்.

என்னும் **தேரன் பொருட்பண்பு நூலில்** கூறப்பட்ட செய்யுளால் அறியலாம்.

குணபாடம் தாது சீவ வகுப்பு.

புறமருத்துவத்தில் கந்தகம்:

கந்தகம், கருஞ்சீரகம், எண்ணெய் சேர்த்து சிரங்கிற்கு மேற்பூச்சாகப் பூசப் பயன்படுகிறது.

வைத்திய மூலிகை அகராதி

தேங்காய் எண்ணெயுடன் கலந்து சிரங்குகளுக்கும் போடுவதுண்டு.

வேப்பெண்ணெயுடன் கலந்து வாதம், முடக்குவாதம், சூலைக்கட்டுக்கு உபயோகிக்கலாம்.

சாம்பசிவம்பிள்ளை பேரகராதி.

கந்தகத்தை எண்ணெயுடன் கலந்து உடலில் தேய்த்து உடனே குளிர்ந்த நீரில் நனைத்துக் கொண்டால் குட்ட ரோகம் நிவர்த்தியாகும்.

அனுபோக வைத்திய தேவ ரகசியம்.

கந்தகம் சேரும் மருந்துகள்:

- ✓ மேககுலாந்தக மாத்திரை.

அகத்தியர் அட்டவணை வாகடம்.

- ✓ அண்டத்தைலம்.

சித்த மருத்துவக்களஞ்சியம், ப.எண்:208.

- ✓ பிரமேக சஞ்சீவி மாத்திரை.

வீரமாமுனிவர் வாகடத் திரட்டு.

- ✓ கந்தக மெழுகு.

கண்ணுசாமி பரம்பரை வைத்தியம்.

- ✓ மேகச்சூரணம்.

சித்த மருத்துவக்களஞ்சியம், ப.எண்:287.

சாதிக்காய்

வேறு பெயர்:

குலக்காய், ஜாதிக்காய்.

பயன்படும் உறுப்பு : காய்.

சுவை : துவர்ப்பு, கார்ப்பு.

தன்மை : வெப்பம்.

பிரிவு : கார்ப்பு.

செய்கை:

வெப்பமுண்டாக்கி : Stimulant.

அகட்டுவாய்வகற்றி : Carminative.

மூர்ச்சையுண்டாக்கி : Narcotic.

மணமூட்டி : aromatic.

காமம்பெருக்கி : Aphrodisiac.

உரமாக்கி : Tonic.

குணம்:

இதனால் விந்து குறைவு, பெருங்கழிச்சல், வாயுவினாலுண்டாகும் நோய், தலைவலி, இரைப்பு, இருமல், நாட்பட்ட கழிச்சல், வெப்பத்தை முன்னிட்டு வரும் பிணிகள் இவைகள் போகும். ஆனால் மயக்கத்தைத் தரும். மேலும் இது வயிற்றுவலி, வயிற்றுப்பொருமல், அக்கினி மந்தம் இவைகளையும் போக்கும்.

தாதுநட்டம் பேதி சருவாசி யஞ்சிர நோய்
ஓதுசுவா சங்காசம் உட்கிரணி – வேதோ
டிலக்காய் வரும்பிணிபோம் ஏற்றமயல் பித்தங்
குலக்கா யருந்துவர்க்குக் கூறு.

அளவு : 320மி.கி – 1000மி.கி எடை.

உபயோகிக்கும் முறை:

இதன் சூரணத்தில் வேளைக்கு1/8 - 1/4 விராகனெடை தினம் 2-3 வேளை பசுவின்பாலில் போட்டுக் கலக்கிக் கொடுத்துவர விந்துகட்டும், பேதிகட்டும், வாத கிராணி தீரும். இது இரைப்பைக்கும், ஈரலுக்கும் வலவைக் கொடுக்கும், தேக அழலையாற்றும், சந்தோஷத்தை உண்டாக்கும். நடுக்கம், பக்கவாதம், வாந்தி, ஒக்காளம் இவற்றைப் போக்கும். அதிக அளவில் கொடுக்க மயக்கத்தை உண்டாக்கும். ஆகையால் தேகபாவத்திற் கேற்றவாறு அளவைச் சரிப்படுத்திக் கொள்ள வேண்டும்.

சாதிக்காய் சேரும் மருந்துகள்:

- ✓ தீபாக்கினிச் சூரணம்:

பதார்த்த குண விளக்கம், ப.எண்:827.

- ✓ மேகநாத தைலம்:

தேரையர் நீர்க்குறி வைத்தியம், ப.எண்:59.

- ✓ சௌபாக்கியசுண்டி லேகியம்:

அகத்தியர் வைத்திய காவியம் - 1500, ப.எண்:809.

- ✓ காய்ச்சுக்கட்டிச் சூரணம்:

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:122.

- ✓ கூழ்ப்பாண்ட லேகியம்:

அகஸ்திய வைத்திய ரத்தின சுருக்கம் -360, ப.எண்:43.

சாதிபத்திரி

வேறு பெயர்:

ஜாதிபத்திரி, வசுவாசி.

சுவை : கார்ப்பு, துவர்ப்பு.

தன்மை : வெப்பம்.

பிரிவு : கார்ப்பு.

செய்கை:

காமப்பெருக்கி : Aphrodisiac.

அகட்டுவாய்வகற்றி : Carminative.

வெப்பமுண்டாக்கி : Stimulant.

உறக்கமுண்டாக்கி : Hypnotic.

குணம்:

இதனால் தாபசுரம், நிணபேதி, நீர்க்கழிச்சல் இவை போம். இது உடற்கட்டுகளை வலுக்கச் செய்யும். அழலை உண்டாக்கும்.

சாதிதரும் பத்திரிக்குத் தாபச் சுரந்தணியும்
ஓதுகின்ற பித்தம் உயருங்காண் - தாதுவிர்த்தி
யுண்டாங் கிரகணியோ டோதக் கழிச்சலறும்
பண்டாங் குறையே பகர்.

அகத்தியர் குணவாகடம்.

வழக்கு:

சாதிக்காய்க்குள்ள குணமே இதற்குமுண்டு.

சாதிப்பத்திரி சேரும் மருந்துகள்:

- ✓ கட்டுவாதி மாத்திரை:

பதார்த்த குண விளக்கம், ப.எண்:328.

- ✓ காளமேக நாராயண மாத்திரை:

தேரையர் நீர்க்குறி வைத்தியம், ப.எண்:57.

- ✓ அட்ட சூரணம்:

அகஸ்தியர் வைத்திய காவியம் - 1500, ப.எண்:715.

- ✓ பறங்கிச்சக்கை சூரணம்:

பதார்த்த குண விளக்கம், ப.எண்:500.

- ✓ அதிவிடயச் சூரணம்:

அகத்தியர் வைத்திய காவியம் - 1500, ப.எண்:716.

இலவங்கம்

வேறு பெயர்:

அஞ்சுகம், உற்கடம், கிராம்பு, சோசம், திரளி, வராங்கம்.

சுவை : காரமும் விறுவிறுப்புமுள்ளது.

தன்மை : வெப்பம்.

பிரிவு : கார்ப்பு.

செய்கை:

இசிவகற்றி : Antispasmodic.

அகட்டுவாய்வகற்றி : Carminative.

பசித்தீத்தூண்டி : Stomachic.

குணம்:

இது மயக்கம், பேதி, வாந்தி, குருதிக்கழிச்சல், நாட்பட்ட கழிச்சல், எருவாய்க்கடுப்பு, செவிநோய், சிவந்த மச்சம், கறுத்த மச்சம், கண்ணில் பூ, படைகள் ஆகியவற்றை நீக்கும்.

பித்த மயக்கம் பேதியொடு வாந்தியும்போம்
சுத்தவிரத் தக்கடுப்புந் தோன்றுமோ – மெத்த
இலவங்கங் கொண்டவருக் கேற் சுகமாகும்
மலமங்கே கட்டுமென வாழ்த்து.

சுக்கிலநட் டங்கர்ண சூர்வியங்க லாஞ்சனந்தாட்
சிக்கல்விடாச் சர்வா சியப்பிணியு – மக்கிக்குட்
டங்கப் பூவோடு தரிபடருந் தோன்றிலில்
வங்கப்பூ வோடுரைத்து வா.

அகத்தியர் குணவாகடம்.

வழக்கு:

- கிராம்பை நீர் விட்டு மை போலரைத்து, நெற்றியிலும், மூக்குத்தண்டின் மீதும் பற்றிட தலைபாரம், நீரேற்றம் குணமாகும்.
- தணலில் வதக்கி வாயிலிட்டுச் சுவைக்க, தொண்டைப்புண் ஆறும். பற்களின் ஈறு கெட்டிப்படும்.
- இரண்டு ஆழாக்கு வெந்நீரில், கிராம்புத்தூள் பலம் கால் சேர்த்து, அரை மணி நேரம் வரையில் மூடி வைத்து வடிகட்டி, 1/8 முதல் 1/2 ஆழாக்கு வீதம் உட்கொள்ள, பசித்தீயைத் தூண்டிக் கழிச்சலைப் போக்கும். பிள்ளைத் தாய்ச்சியின் வாந்தி நிற்கும்.

- கிராம்பும், நிலவேம்பும் சமமெடுத்துக் குடிநீர் செய்து கொடுக்க பசி உண்டாகும். அயர்ச்சி நீங்கும். சுரத்திற்குப் பின் உண்டாகும் களைப்பைப் போக்கும்.
- நிலாவாரைக் குடிநீரில் 1 முதல் 1 1/2 குன்றியெடை கிராம்புத்தூளும், சுக்குப் பொடியும் சேர்த்துச் சாப்பிட சுகமாய்ப் பேதியாகும்.
- பித்தவாந்தி, சுக்கிலநட்டம், வயிற்றுப்போக்கு இவற்றின் பொருட்டுச் செய்யப்படுகின்ற மருந்துகளில் அனேகமாய்க் கிராம்பும் சேரும்.

குணபாடம் மூலிகை வகுப்பு, முதற்பாகம், ப.எண்:111-112.

கிராம்பு

காரம்கா ரம்பு கடவுமலர் தின்லவங்க
மாரக் குணமதிக மாகுமே – சேரத்
திரிதோடம் வாந்தியொடு சேர்க்கழிச்சல் வெப்பு
மரிதோடப் போமே அகன்று.

வேறு பெயர்கள்:

காரம், கடவுமலர், இலவங்கம்.

குணம்:

திரிதோடம், வாந்தி, கழிச்சல், இவற்றைப் போக்கும்.

சேரும் பிற மருந்துகள்:

ஆறுவித மூலங்களுக்கு கியாழம்:

இலவங்கம் 5 கழஞ்சு
விலாமிச்சம் வேர் 5 கழஞ்சு
சுத்த ஜலம் 1 படி

இருவகை சரக்குகளையும் நறுக்கி ஒரு பாத்திரத்திலிட்டு 1 படி ஜலம் விட்டு நன்றாக தீப்பறக்கக்காய்ச்சி ஆழாக்கு கியாழமாய இறக்கி தினமும் அதிகாலையில் அருந்தவும். இது போல் 5 நாள் அருந்த முளைமூலம், சீழ்மூலம், உள்மூலம், வெளிமூலம், இரத்தமூலம், ஜலமூலம் முதலிய மூலவியாதிகள் உடனே நீங்கும்.

தேரையர் நீர்க்குறி வைத்தியம், ப.எண்:82.

மகத்வகாதிச் சூரணம்

அகத்தியர் இரண்டாயிரம், ப.எண்:154.

அட்ட சூரணம்

அகத்தியர் வைத்திய காவியம் - 1500, ப.எண்:715.

தாளிச பத்திரி வடகம்

அகத்தியர் வைத்திய காவியம் - 1500, ப.எண்:825.

சிறுநாகப்பூ

வேறு பெயர்:

நாகம், நாகபுட்பம், நாகேசரம், கேசரம், சாம்பேயம்.

பயன்படும் உறுப்பு: பூ.

சுவை : சிறுகைப்பு, துவர்ப்பு.

தன்மை : தட்பம்.

பிரிவு : கார்ப்பு.

செய்கை:

பூ - துவர்ப்பி - Astringent.

அகட்டுவாய்வகற்றி - Carminative.

குணம்:

இது வெள்ளை, இருமல், கழிச்சல் இவைகளைப் போக்கும்.

சிறுநாகப் பூவினது செய்கைதனைச் சொல்வோம்
குறியாகும் மேகத்தைக் கொல்லும் - நெறிவிட்டுத்
தீதாய்ச் செல்வாயுவையுந் தீர்க்குமிரு மற்போக்கும்
கோதாய்! இதையறிந்து கொள்.

மேலும் நீரடைப்பு, குருதிப்போக்கு, புண், கொப்புளம், காலெரிச்சல் ஆகியவை போக்கும்.

சிறுநாகப்பூ சேரும் மருந்துகள்:

- ✓ அதிவிடயச் சூரணம்:

  அகத்தியர் வைத்திய காவியம் - 1500, ப.எண்:716.

- ✓ அசுவகந்தி லேகியம்:

  பதார்த்த குண விளக்கம், ப.எண்:10.

- ✓ நீர்பேதிச் சூரணம்:

  சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:106.

- ✓ இலவங்காதி சூரணம்:

  சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:121.

- ✓ முடித்தைலச் சூரணம்:

  சிகிச்சாரத்நதீபம் என்னும் வைத்திய நூல், ப.எண்:118.

அமுக்கிராக் கிழங்கு

வேறு பெயர்:

அமுக்கிரி, அமுக்குரவி, அமுக்குரவு, அமுக்கினாங்கிழங்கு, அசுவகந்தம், அசுவகந்தி, அசுவம், இருளிச்செவி, கிடிச்செவி, வராககர்னி.

பயன்படும் உறுப்பு : வேர் (கிழங்கு).

சுவை : (யாவும்) கைப்பு.

வீரியம் : வெப்பம்.

பிரிவு : கார்ப்பு.

செய்கை:

கிழங்கு - உடற்றேற்றி : Alterative.

ஆண்மைபெருக்கி : Aphrodisiac.

வீக்கமுருக்கி : Deobstruent.

சிறுநீர்ப்பெருக்கி : Diuretic.

உரமாக்கி : Tonic.

உறக்கமுண்டாக்கி : Soporitic.

உடல்வெப்பகற்றி : Sedative.

குணம்:

இக்கிழங்கு கயம், வளிக்கூட்டங்கள், கரப்பான், சுரம், வீக்கம் இவைகளைப் போக்கும். பசித்தீயையுண்டாக்கும்.

கொஞ்சந் துவர்ப்பாங் கொடியகயம் சூலையரி
மிஞ்சுகரப் பான்பாண்டு வெப்பதப்பு - விஞ்சி
முசுவுரு தோடமும்போ மோகம்அன லுண்டாம்
அசுவகந் திக்கென்றறி.

- **அகத்தியர் சூத்திரம்.**

அமுக்கினாங் கிழங்கு:

.....
.....கோல
நகுட வெருண்டுதிர நாட்டுவையேன் மேலை
நகுட வெருண்டுறுவாழ் நாள்.

அமுக்கினாங்கிழங்கை பொடி, நெய் முதலியன செய்து பயன்படுத்தினால் உறுதி, அழகு, நீண்ட ஆயுள் முதலியவைகள் உண்டாகும்.

உபயோகிக்கும் முறை:

அசுவகந்திக்கிழங்கை சிறுதுண்டுகளாக நறுக்கிப் பசுவின் பாலில் அவித்து உலர்த்தி இடித்துச் சூரணம் செய்து சமனெடை சர்க்கரைக்கூட்டிப் புட்டியில்

பத்திரப்படுத்துக. வேண்டும்போது இச்சூரணத்தை வேளைக்கு ஒரு வராகனெடை வீதம் தினம் இருவேளை பசுவின்பாலில் கலக்கிக் கொடுக்க தேக வனப்பை உண்டாக்குவதுடன் தேகத்திலுள்ள துர்நீர், கபம், சூலை, கரப்பான், பாண்டு, மேக அழலை, வெட்டை, வீக்கம், கட்டி, பித்த மயக்கம் முதலியவற்றை நீக்கும்.

அமுக்கிராக் கிழங்கு சேரும் மருந்துகள்:

- ✓ அசுவகந்தி லேகியம்.

  பதார்த்த குண விளக்கம், ப.எண்:10.

- ✓ அசுவகந்தி தைலம்:

  பதார்த்த குண விளக்கம், ப.எண்:10.

- ✓ மஸ்துமிரசாயனம்:

  அகஸ்தியர் வைத்திய ரத்தின சுருக்கம் - 360, ப.எண்:53.

- ✓ தாளிசபத்திரி வடகம்:

  அகத்தியர் வைத்திய காவியம் - 1500, ப.எண்:825.

- ✓ மகத்வகாதி சூரணம்:

  அகஸ்தியர் இரண்டாயிரம், ப.எண்:154.

கொடிவேலி வேர்ப்பட்டை

வேறு பெயர்:

கருநாகம், கனலி, காரிமை, கொடுவேலி, காளிலிந்திரன், கானிலம், கொடிச்சி, சித்திரமூலி, சித்திரமூலம், சித்திரம், ஞெகிழி, தழல், திக்கு, திசைநா, வஞ்சதாரம், வன்னி, அக்னி, அதிசனசி உதகவன், சதாவேதா, சித்திரகம், தபனன், திகனா, வசகம், வனமா, வன்னிபரியம், சித்ரகம், கொடிவன்னி, வலிவன்னி, திவிபிநாமம்.

பயன்படும் உறுப்பு	:	வேர்ப்பட்டை.
சுவை	:	கார்ப்பு, விறுவிறுப்பு.
தன்மை	:	வெப்பம்.
பிரிவு	:	கார்ப்பு.

செய்கை:

முறைவெப்பகற்றி	:	Anti periodic.
வியர்வையுண்டாக்கி	:	Diaphoretic.

பொதுக்குணம்:

இதனால் கட்டி, புண், கழலை, வளிநோய், அரையாப்புக்கட்டி, குத்தல், சோபை, மூலரோகம், உதிரக்கட்டு, நீரேற்றம், பெருவயிறு இவை போம்.

கட்டிவிர ணங்கிரந்தி கால்கள் அரையாப்புக்
கட்டிச்சூ லைவீக்கங் காழ்மூலம் - முட்டி ரத்தக்
கட்டுநீ ரேற்றங் கனத்த பெருவயிறும்
அட்டுங் கொடிவேலி யாம்.

அகத்தியர் குணவகாடம்.

இன்னும் இதனால் சூலைக்கட்டு, குறிப்புண், கிரந்தி, மேகப்புண், நெறிசுரம், நச்சுச்சுரம் முதலியவையுந் தீரும்.

உபயோகிக்கும் முறை:

இதன் வேர்ப்பட்டையை அரைத்து வேளைக்கு 1/4 அல்லது 1/2 சுண்டைக்காய்ப் பிரமாணம் பசுவின்பாலிலாவது அல்லது வெள்ளாட்டுப்பாலிலாவது கலக்கி 10 அல்லது 15 நாள் கொடுத்துவரப் பழையசுரம், புரையோடும் அரையாப்புக் கட்டி, சூலைக்கட்டு, சூலைப்பிடிப்பு, வெடிசூலை, தேகத்தில் கரடுமுரடாகக்கட்டுஞ்சூலை, உள்மூலம், கிரந்தி, கருப்பவாயு முதலிய பிணிகள் தீரும்.

பதார்த்த குண விளக்கம், ப.எண்:279.

கொடிவேலி சேரும் மருந்துகள்:

- ✓ சித்திரமூல நெய்:

பதார்த்த குண விளக்கம், ப.எண்:280.

- ✓ கொடிவேலிச் சூரணம்:

பதார்த்த குண விளக்கம், ப.எண்:280.

- ✓ அக்கினிமுகச் சூரணம்:

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:122.

- ✓ திப்பிலி ரசாயனம்:

அகஸ்தியர் வைத்திய ரத்தின சுருக்கம் -360, ப.எண்:51.

- ✓ மகாவில்வாதி லேகியம்:

அகஸ்தியர் வைத்திய ரத்தின சுருக்கம் -360, ப.எண:40.

- ✓ தசதீபாக்கினி சூரணம்:

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:117.

சடாமாஞ்சில்

வேறு பெயர்:

சடாமாசி, ஜடமாஞ்சி, பைசாசி, சடிலை, மாமிசி பூதசேசிநி.

பயன்படும் உறுப்பு : வேர்.

சுவை : இனிப்பு (பச்சையில்), (காய்ந்தபின்) கார்ப்பு.

தன்மை : வெப்பம்.

பிரிவு : கார்ப்பு.

செய்கை:

வெப்பமுண்டாக்கி : Stimulant.

இசிவகற்றி : Antispasmodic.

சிறுநீர்ப்பெருக்கி : Diuretic.

கோழையகற்றி : Expectorant.

குணம்:

இதற்கு சிலந்தி நஞ்சு, பழையசுரம், உட்சூடு, வாய்வு, கழிச்சல், கண்ணோய், இருமல், குருதியழல், இரைப்பு நீங்கும்.

குட்டஞ் சிலந்திவிடம் கோர புராண சுரம்
உட்டினங்கால பேதிகண்ணோய் ஒட்டிருமல் - சொட்டிரத்த
பித்தமிரைப் பேகும் பெருங்கோரை என்றுரைக்குஞ்
சுத்தசடா மாஞ்சிலை சொல்.

அகத்தியர் குணவாகடம்.

உபயோகிக்கும் முறை:

2 வராகனெடை சடாமாஞ்சிலை நசுக்கி ஒரு கலயத்தில் போட்டு 1/4 படி சலம்விட்டு 1/8 படியாகச் சுண்டக் காய்ச்சி வடிகட்டி வேளைக்கு 1-2 அவுன்ஸ் வீதம் தினம் 2 வேளை கொடுக்கலாம். இவை இரைப்பைக்கும், ஈரலுக்கும் பலத்தைக் கொடுக்கும். உதிரச் சிக்கலை நீக்கும். நீரை வரட்டும். தீபனத்தை உண்டாக்கும். இதனை அதிக அளவாகவும் நீடித்தும் கொடுக்கக் கூடாது. அங்ஙனம் கொடுக்க தலைவலி, மயக்கம், பாவை மந்தம் இவற்றை உண்டாக்கும்.

பதார்த்த குண விளக்கம், ப.எண்:304.

சடாமாஞ்சில் சேரும் மருந்துகள்:

- ✓ சடாமாஞ்சில் சூரணம்:

பதார்த்த குண விளக்கம், ப.எண்:304.

- ✓ பாலாட சூரணம்

அகஸ்தியர் வைத்திய காவியம், ப.எண்:727.

- ✓ முடித்தைலச் சூரணம்

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:118.

- ✓ இலவங்காதி சூரணம்

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:121.

- ✓ மேகநாத தைலம்

தேரையர் நீர்க்குறி வைத்தியம், ப.எண்:59.

- ✓ மந்த வாய்வுக்கு சூரண முறை

தேரையர் நீர்க்குறி வைத்தியம், ப.எண்:81.

பச்சைக் கற்பூரம்

அட்டகுன்மஞ் சூலை யணுகாது வாதமொடு
துட்டமே கப்பிணியுந் தோற்றாவே – மட்டலருங்
கூந்தன் முடிமாதே கொட்டுங் கபம்போகுஞ்
சார்ந்தபச்சைக் கற்பூரத் தால்.

பதார்த்த குண விளக்கம், ப.எண்: 148.

குணம்:

பச்சைக் கருப்பூரத்தினால எட்டுவித குன்மங்கள், கீல்களில் குத்தல், வாதநோய், சீழ்ப்பிரமேகம், சிலேஷ்ம கோபம் இவைகள் நீங்கும்.

இந்த இனத்தில் ஈசன், வீமன், பூதாச்சிறையன் என மூன்று வகைப்படும்.

செய்கை:

குளிர்ச்சியுண்டாக்கி, உடல் வெப்பகற்றி, உடற்றேற்றி.

உபயோகிக்கும் முறை:

இதை வேளைக்கு அரைக்கால், கால் குன்றியெடை இதரச் சரக்குகளுடன் கூட்டிக் கொள்ளலாம். தனியாக உபயோகப்படுத்துவது கிடையாது. சிறிது கஸ்தூரியுடன் சேர்த்துத் தேன் விட்டு மத்தித்துக் கொடுக்க கபத்தையும் சுரரோகத்தையும் கண்டிக்கும்.

இரண்டு தோலா அரைத்த சந்தனத்துடன் ஒரு குன்றி எடை பச்சைக் கற்பூரமும் குங்குமப் பூவும் கூட்டிச் சரீரத்திற்குப் பூச வெப்பமும் எரிச்சலும் அடங்கும்.

பச்சைக் கற்பூரம் சேரும் மருந்துகள்:

- ✓ நவயோக மாத்திரை:

தேரையர் நீர்க்குறி வைத்தியம், ப.எண்:58.

- ✓ நாராயணாத்திர மாத்திரை:

தேரையர் சேகரப்பா, ப.எண்:185.

- ✓ பச்சைக் கற்பூர மாத்திரை:

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:127.

- ✓ கஸ்தூரி மாத்திரை:

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:128.

- ✓ கோரோசனை மாத்திரை:

சிகிச்சாரத்ந தீபம் என்னும் வைத்திய நூல், ப.எண்:129.

சீனிச்சருக்கரை

சீனிச் சருக்கரைக்குத் தீராத வன்சுரமுங்
கூவிக்கும் வாதத்தின் கூட்டுறவு - மேனிற்கும்
வாந்தி யொடுகிருமி மாறாத விக்கலுமே
போந்திசையை விட்டுப் புரண்டு.

குணம்:

சீனிச்சருக்கரைக்கு வாதசுரம், வக்கிரிக்கின்ற வாத நோய்கள், வமனம், கிருமிரோகம், நீங்காத விக்கல் ஆகிய இவைகள் போம் என்க.

செய்கை: உரமாக்கி, உள்ளழலாற்றி.

உபயோகிக்கும் முறை:

- அரை முதல் ஒரு தோலா எடை சர்க்கரையில் சிறிது ஆவின் நெய் கூட்டியாவது அல்லது பாலுடன் சிறிது ஏலக்காய் வித்தின் சூரணமிட்டாவது உட்கொள்ளப் பித்தம், அரோசகம், மெய்மயக்கம் முதலியவைகள் நீங்கும். இதனால் இரத்தம் சுத்தப்படுவதுடன் மலத்தை இளகலாகப் போகச் செய்யும்.இது சுவாச உறுப்புகளுக்கும், ஈரலுக்கும், இருதயத்திற்கும் வலுவைக் கொடுக்கும். நரம்புகள் கெட்டிப்படும். இக்கருத்தினைக் கொண்டே அறிவாளர்கள் பெரும்பான்மையான சூரணங்களில் சமனெடை சர்க்கரை கூட்டி உபயோகம் செய்யும்படியாகக் கூறியிருக்கின்றனர்.
- சர்க்கரையுடன் வாதுமை நெய்யைக் கூட்டிச் சப்பிட தொண்டைக் கம்மலை நீக்கும். இன்னும் இது குன்ம வலியையும், அபானவாயுவின் தடையையும் குணப்பணடுத்தும்.
- சிற்றாமணக்கு எண்ணெயிற் சர்க்கரை கூட்டிக்கொடுக்க பிரசவித்த ஸ்தீரிகளுக்கு தடைப்பட்டுள்ள உதிரச்சிக்கல், நீரடைப்பு இவைகளை நீக்கும்.
- சர்க்கரையை பாலிலாவது சலத்திலாவது கரைத்து வடிகட்டிச் சாப்பிட தொண்டைப் புகைச்சல், இருமல், குரல்கம்மல், மார்பு உலர்ந்துபோதல், துர்பலமானவர்கள் போகத்தில் ஈடுபட்டு உண்டான நடுக்கம், இருதயத்துடிப்பு முதலியவைகள் நீங்கும்.
- சுத்தமான சர்க்கரையைப் பொடிசெய்து கண்களில் சிறிதுபோட கண்களிலுள்ள மாசுகளை வெளிப்படுத்தும். சதை வளர்ந்திருப்பினும் கரைக்கும்.
- சர்க்கரையைச் சிறிது கரி நெருப்பனலில்போட்டு முகத்தை அதற்கு நேராக வைத்துக் கொண்டு கண்ணைத்திறவாமல் மேற்போர்வையிட்டு புகையை நாசியின் வழியாக உள்ளுக்கு கொள்ளச் சலதோஷம், அதனாலுண்டான நாசியின் அடைப்பு, தும்மல் ஆகிய இவைகள் போம்.

- வெட்டுக்காயம், அடிபட்டகாயம் இவைகளுக்குச் சர்க்கரையுடன் சிறிது சுண்ணாம்பு கூட்டி மத்தித்துக் காயத்தின்மேற்போட ரத்தம் வெளிவரவொட்டாமல் ஆறும்.

பதார்த்த குண விளக்கம், ப.எண்:866,820.

சீனி சேரும் மருந்துகள்:

- ✓ ஆடாதோடை மணப்பாகு

சித்த வைத்திய திரட்டு, ப.எண்:357.

- ✓ கற்பூராதி சூரணம்

அகத்தியர் அட்டவணை வாகடம், ப.எண்:100.

- ✓ தாளிசாதிச் சூரணம்

சித்த வைத்திய திரட்டு, ப.எண்:357.

தேன்

பித்தமுடன் வாந்தி பிரியாத தொந்த கபம்
எத்திவரும் வாய்வு மிறங்கிப்போ – மெத்தவுமே
ஊனிலுறும் ரத்தமறை யுற்றபடி சுத்திசெய்யும்
தேனின் பொதுக்குணமே செப்பு.

குணம்:

நல்ல தேனால் பித்தம், வாந்தி, கப சம்பந்தமான ரோகங்கள், வாயு, இரத்தத்திலுள்ள குற்றங்கள் முதலியவை நீங்கும் என்க.

செய்கை:

உள்ளழலாற்றி, மலமிளக்கி (அதிக அளவில்).

உபயோகிக்கும் முறை:

- வேளைக்கு 1, 3 தேக்கரண்டி அளவு சலத்துடன் கலந்து தினம் 2 வேளை கொடுப்பதுண்டு. இது இரத்தத்தைச் சுத்திசெய்வதுடன் ஜீவாக்கினியை விருத்தி செய்யும்.
- சாதாரணமாக மருந்துகளைத் தேனில் அனுபானம் செய்து கொடுக்க இரத்தத் தாரைகள் வழியாக விரைவில் சென்று நோயைக் குணப்படுத்தும். இக்காரணத்தைக் கொண்டே தேன் அனுபானங்களில் சிறந்ததென ஆன்றோர் கூறியிருக்கின்றனர்.
- தேனைத் தேகத்திடத்திற்கு ஏற்றவாறு 1, 11/2 தேக்கரண்டி அளவு சலத்தில் விளாவித் தினம் இருவேளையாகச் சிலநாள் தொடர்ச்சியாகக் கொடுத்துவர வீக்கம், காமாலை, கல்லடைப்பு, நீரடைப்பு, பக்கவாதம், சூலை முதலிய ரோகங்கள் குணமாகும்.
- தேனைச் சலத்தில் விளாவிக் கொடுக்கச் சிறுநீர் பெருகும். நீர்த்தாரையில் கண்டுள்ள புண்களை ஆற்றும். வயிற்றுநோயையும் தாகத்தையும் அடக்கும். தாது பலத்தை விசேஷிக்கச் செய்யும். இன்னும் இதைக் குடித்து வாந்தியெடுக்க அபினியின் விஷம் மாறும்.
- தேனைக் கருஞ்சீரகக் கியாழத்தில் சேர்த்துக் கொடுக்க கீல்வாதம் போம்.
- சீரகக் கியாழத்தில் கொடுக்க வெறிநாய்க்கடி, விஷக்கடி முதலியவைகள் போம்.
- வெள்ளை வெங்காயச் சாற்றில் சேர்த்துக் கண்களில் இரண்டொரு துளி விட்டுக் கொண்டுவரக் கண்திரை மாறும்.

பதார்த்த குண விளக்கம், ப.எண்:241.

தேன் சேரும் மருந்துகள்

- ✓ நாரத்தை லேகியம்
- ✓ தேற்றாங்கொட்டை லேகியம்

சித்த வைத்திய திரட்டு

MODERN ASPECT

Smilax china Linn.

Family	**:**	Liliaceae.
English name	:	China root.
Sanskrit name	**:**	Dvipantaravaca, Madhusnuhi.
Tamil name	**:**	Parankicekkai.
Distribution	**:**	In China and Japan.
Parts used	**:**	Rhizomes.

Properties and uses:

The rhizomes are bitter, acrid, thermogenic, anodyne, anti-inflammatory, digestive, laxative, depurative, aphrodisiac, diuretic, sudorific, febrifuge and tonic. They are useful in syphilis, leprosy, skin diseases, epilepsy, insanity, scrofula, vitiated conditions of vata, flatulence, dyspepsia, colic, neuralgia, constipation, helminthiasis, psoriasis, fever, strangury, seminal weakness and general debility. [15]

TRADITIONAL USES OF SMILAX CHINA:

- Aphrodisiac in the form of decoction. Dose is I ounce thrice daily.
- It is boiled in milk to which mastaki; cardamoms and cinnamon are added and taken internally in rheumatism, gout, epilepsy, chronic nervous diseases, cachexia, seminal weakness and constitutional syphilis.
- It is used along with anantamul and other drugs of reputed efficacy in syphilis and rheumatism.
- **Leucorrhea:** Leucorrhea can be controlled effectively by taking rhizome powder 5mg with milk and drink it.
- **Diabetes:** A decoction of *Smilax china* root and *fructus mume* can be used in treating diabetes.
- **Excretion:** Powdered *Smilax china* root is taken with rice paste to treat Urolithiasis
- **Chronic arthritis and secondary and tertiary syphilis:** 4-5gram of the coarse root powder is cooked well with 200ml of water and reduced to 60ml. Filtered and consume 2-3 weeks medication gives good result in arthritis and secondary and tertiary syphilis.

- **Pemphigus and Skin diseases:** Equal amount of Sarsaparilla and China root are taken and made into decoction. This is taken twice daily for the complaints such as pemphigus and chronic skin diseases.
- **Schizophernia and epilepsy:** 10g of China root is added with 50ml water. Macerated, filtered. This infusion is consumed early in the morning or in late evening. This is considered to be a very effective for treatment of epilepsy, insomnia and schizophrenia.
- **Osteo-arthritis:** 1-2gram of the powder is mixed with honey in cases like arthritis and neuralgia. It contributes significant benefits in above complaints.
- **Relieving joint Numbness:** Medicated wine with *Smilax china* root is take orally to relieve joint numbness or tingling. [24]

Precaution:

- Avoid excessive dosages it may causes nausea and vomiting.
- Vinegar should not be used whole using the herb.
- Pregnant and lactating women should avoid China root formulations as it may affect their health. [24]

SULPHUR

English name	**:**	Brimstone.
Sanskrit name	**:**	Gandhaka.
Tamil name	**:**	Gandakam.

Source:

A non metallic element found free in beds of gypsum and in a state of sublimation in regions of exinct volcanoes; also in combination with several ores called phyrites, as sulphates and sulphides of iron, copper, lead, zinc, mercury etc. In India it occurs naturally in some parts, in Nepalm Kashmir, Afghanistan and in Burma. It is a constituent of various vegetable and animal substances such as albumin etc. It is obtained by roasting, fusion or by sublimation. [23]

Characters:

As met in the bazaar, it is of four kinds:

1. Yellow variety or vitreous or precipitated sulphur or Amlasar gandhaka.
2. The white variety known as roll sulphur.
3. The red variety is called Rati hirakasi or Lal gandhak.
4. The black variety, i.e., sublimed sulphur is a purified form of sulphur and is prepared by washing Gandhaka in milk. It is first dissolved in an iron ladle smeared with butter and they gradually poured into a basin of milk. When cool and solidified it is fit for use. It is a light yellow powder of a bitter astringent taste and of a peculiar smell.

   Dose is 12 to 24 grains with milk or other vehicle.

   Yellow variety employed for internal use in combination with mercury. [23]

Action:

Sulphur is described as of bitter astringent taste with a peculiar strong smell. It increases bile, acts as a laxative, diuretic and insecticide. Sulphur, when taken internally and in small doses, becomes absorbed and may be detected in the sweat, milk and urine. It is a stimulant to the secreting organs such as the skin and the bronchial mucous membranes. It has a specific action on the rectum and increases the haemorrhoidal secretions. The sulphurous and mineral waters as they contains earthy

and alkaline sulphates act as laxative and diuretic, while the sulphurous acid disengaged from them acts as a diaphoretic. In large doses it acts as a purgative. [23]

TOXICOLOGICAL ASPECTS OF SULPHUR:

Sulphur is not a highly toxic substance. Improperly purified and irregularly prepared sulphur medicine if consumed over a long period then it causes toxic effects.

The toxic features are as follows:

- Yellowish discolouration of conjunctiva
- Pallor of the face
- Discolouration of the skin similar to the colour of ridged gourd flower
- Disfigured and blackish teeth
- Profuse hyperhidrosis with yellowish colour
- Urine appears like goat's urine
- Faeces is dark yellow coloured
- Bad breath.
- Dyspepsia
- Flatulence
- Distended abdomen with pain
- Macules [23]

Antidote:

- A decoction prepared with the roots of i) *Cassia auriculata* ii) *Cleome feline* iii) *Indigofera tinctoria* dried rhizome of *zingiber officinale*, leaves of *Gossipium herbaceum* and *Messua ferrea* can be given as an antidiote for sulphur toxicity.
- Paste of seeds of lotus in tender coconut water is also used as an antidote.
- A decoction of equal parts of *Piper nigrum*, *Indigofera tinctoria* root and *Cuminum cyminum* is also usd as an antidote.
- A decoction is prepared with *Piper longum* ,*Glycyrrhiza glabra* and the root bark of *Solanum nigrum* taking 10g each and given for 40 days in the morning and evening or till the poisonous effects are neutralised.

செய்யகந்தி தின்றோர்க்குச் செப்புவாயாவிரம் வேர்
தைவேளை வேர்நீலி தன் மூலம் - துய்யசுக்கு
நல்ல பரத்தியிலை நாகேசுரம் கமனா
மல்ல குடிநீரிட்டு வார்.
வார்ப்பா யிளநீரில் வண்டா மரைவிதையை
நேர்ப்பா யரைத்துவடி நீருண்பாய் - கார்ப்பான
நன்மிளகு நீலியின்வேர் நற்சீரகஞ்சமனாம்
மன்னீரிற் காய்ச்சியதை மாட்டு. [44]

(அகத்தியர் விடப்பிரதி விடத்திரட்டு)

Myristica fragrans Houtt.

Family	**:**	Myristicaceae.
English name	**:**	Nutmeg tree, Mace tree.
Sanskrit name	**:**	Jati, Jatikka.
Tamil name	**:**	Jatimaram, Jatikkai.

Habitat:

Nutmeg tree is indigenous to the Malay Peninsula and penang. It has been successfully cultivated in Madras and Southern India (Nilgiri Hills and Malabar Coast).

Seeds of the nutmegs of commerce, and the arillus surrounding the seed within the outer shell constitutes, when dried, the product known as mace. [15]

Parts used:

Dried seed (nutmeg), aril (mace).

Constituents:

Kernel contains a volatile oil, fixed oil, proteins, fat, starch, mucilage and ash. Mace contains a volatile oil with that obtained from the kernel, a fixed oil, resin, fat, sugar,destrin and mucilage. The fixed oil which is called "butter of nutmeg" consists of myristin and myristic acid, and portion of the essential oil. Essential oil contains myristicene and myristicol. Essential oil of mace is of a yellowish colour with odour of mace and consists of macene. [33]

Properties and uses:

The nutmeg and mace are bitter , acrid, astringent, sweet, thermogenic, aromatic, aphrodisiac, anti-inflammatory, anodyne, diuretic, emmenagogue, antispasmodic, febrifuge, narcotic, stimulant, useful in vitiated conditions of kapha and vata, inflammations cephalalgia, helminthiasis, halitosis, dyspepsia, flatulence, colic, cough, dysmenorrhoea, ulcers, hepatopathy, splenopathy, ophthalmopathy, impotency, skin diseases, insomnia, hyperdipsia, cardiac disorders, fever and general debility. [15, 33]

Action:

Nutmeg is aromatic, stimulant and carminative; In large doses, narcotic. Concrete oil is used as a abortifacient; Mace is carminative and aphrodisiac. Mahomedan writers describe nutmeg as stimulating, intoxicating, digestive, tonic and aphrodisiac. "Dr. Osiander describes nutmeg as an antipyretic and Dr. Paracelsus, Lonicerus and Mathiolus describe them as a gastric tonic. The content of ethereal oil, 6-10%, in combination with myristicine gives the nutmeg a tonicising action on the stomach; its effect on the mucous membrane of the urinary passages is irritative, which may account for its use as an aphrodisiac and abortifacient. Drs.Paracelsus, Lonicerus and Matthiolus, used nutmegs with aconstipating action; also as a diuretic against gastric catarrh and cardiac fibrillation. Dr. Osiander found nutmegs useful against the vomiting of pregnancy."- (Dr. Madaus's Book).

Mace is useful in low stages of fever, in consumptive complaints, humoral asthma, and with aromatics in wasting and long continued bowel complaints. When roasted it, as well as nutmeg, is useful in choleriac diarrhoea, flatulent colic and some forms of dyspepsia, obstructions of the liver and spleen. Infusion of nutmeg is useful in quenching the thirst of cholera patients. A paste of it is used as an application to the head in headache; palsy etc, a poultice of it applied round the eyes strengthens the sight.

The seeds are carminative and stomachic; useful in flatulency, nausea, and vomiting. When given at a largely it is essentially narcotic. [24]

Traditional formulations:

- Taking 100mg powder of Jayphal with a bit of goat milk, twice daily for five days, cures diarrhea showing traces of blood in stool.
- Occasionally a patient defecates half digested food that stinks obnoxiously. Patient feels week after passage of stool. This indicates malfunctioning of pancreas. Taking pasted Jayphal, one teaspoonful with a little water, twice daily for a week, cures the ailment.
- Taking 100mg of Jayphal powder with aqueous extract of *Tribulus terrestris* twice daily for five days cures inflammation of urinary tract. Dousing 5gm of crushed seeds of *Tribulus terrestris* in one glass of water overnight a decanting in the morning gives aqueous extract of *Tribulus terrestris.*
- For treatment of inflammations of bladder and urinary tract. [33]

TOXIC EFFECT OF NUTMEG:

Numerous literature report that myristicin is responsible for hallucinogenic effects, which induced by the consumption of nutmeg due to its metabolism structure of 3-methoxy-4, 5- methylendioxyanphetamine. Minimum dosage of nutmeg that can cause psychogenic effect is 5g with 1to2 mg myristicin content and this dosage is considered as toxic dose. At higher dosage of myristicin death may occur. Additionally myristicin poisoning can lead to many health problems that related to brain problem.

Symptoms of nutmeg:

- Hallucinations
- Drowsiness
- Dizziness
- Dry mouth
- Confusion
- Seizure

Some of the other notable side effects were respiratory, cardiovascular and gastric distress.

Texas Poison Center Network received 17 nutmeg poisoning and 64.7% from that cases involved abuse and the rest was unintentional exposure. Most of the nutmeg exposures were via the oral route and minor cases of nutmeg exposures occurred through insufflated nutmeg, unintentional dermal and ocular exposures. Nutmeg also has been misused by mixing it with other drugs in order to get "high". For intoxication cases, treatments like decontamination (cathartic, charcoal, dilution, fresh air, IV fluids) and supportive care (benzodiazepines) will be provided to reduce the effects. [48]

TOXIC EFFECT OF MACE:

Mace is POSSIBLE UNSAFE when taken in doses larger than amounts found in foods. Mace contains the chemical myristicin which has been linked to hallucinations and other mental side effects. People who have taken larger doses of mace have experienced nausea, dry mouth, dizziness, irregular heartbeat, agitation and hallucination.

Mace is unsafe when taken by mouth in doses larger than amounts found in foods. In pregnant women it might cause miscarriages or birth defects.

Mace might reduce immune function. [49]

Syzygium aromaticum (Linn) Merrill & Perry

Family	**:**	Myrtaceae.
English name	**:**	Clove tree, cloves.
Sanskrit name	:	Lavangam, Devakusumam.
Tamil name	:	Kirampu.
Distribution	**:**	Cultivated in south India.
Parts used	**:**	dried flower buds, oil.

Properties and uses:

The cloves are acrid, bitter, aromatic, refrigerant, ophthalmic, digestive, carminative, stomachic, stimulant, antispasmodic, antibacterial, rubefacient, aphrodisiac, appetizer, expectorant, emollient, anthelmintic, sialogogue, rejuvenating, galacto-purifier, diuretic, febrifuge and tonic. They are useful in halitosis, odontalgia, ophthalmopathy, flatulence, colic, gastropathy, anorexia, cough, asthma, vitiated conditions of kapha and pitta, burning sesation, skin diseases, helminthiasis, agalactia, impurity of breast milk, strangury, fever, cephalalgia, neuralgia, laumbago, nostalgia, dental caries, heperacidity, vomiting, dipsis, hepatopathy, general debility and tuberculosis. [40]

TRADITIONAL USES OF CLOVE:

Clove candy – Lavanga Murappa (or) Thithippu:

Theraiyar Maha Karisal, P.No:51.

DANGEROUS SIDE EFFECTS OF CLOVE:

- **INCREASES BLEEDING:** The spice contains a chemical named eugenol, which being a blood thinning agent, can decelerate the process of blood clotting, promoting abnormal bleeding.
- **LOWER SUGAR LEVEL IN THE BLOOD:** Clove can decrease the amount of glucose in our bloodstream significantly, which might be extremely harmful for hypoglycemia patients.
- **TOXICITY:** Clove can also impose serious toxic effects. Whether use large doses of its raw extract. They produce nausea, vomiting, shortness of breath, sore throat, sedation, fluid imbalance, kidney disorders and liver disorders.

- **ALLERGIC REACTIONS:** Allergy is caused by eugenol. Excessive clove ingestion produce rashes, hives, swelling, chocking of throat, etc. In the worst scenario, it develops anaphylaxis. Being an acute whole body allergic reaction, it can cause death.
- **RESPIRATORY PROBLEMS:** Clove cigarette has become highly popular these days. It can result in serious breathing problems like shortness breath and lung infection.
- **SEIZURES:** This spice can cause irregular electrical activity within our brain cells, thereby making vulnerable to one time or multiple seizures. This condition is mainly characterized by unconsciousness and convulsions may end up developing epilepsy too.
- **MAKE THE SKIN SENSITIVE:** Topical application of undiluted clove oil cause irritation, rashes, burns, contact dermatitis. Sometimes damage the skin cells.
- **MOUTH SENSITIVITY:** Mucous membranes present in the inner walls of the mouth can get inflamed by too much consumption of clove or application of its oil.
- **LOSS OF SENSATION:** The eugenol content of clove can turn it into a numbing agent.
- **ERECTILE/EJACULATION ISSUES:** In men clove can cause erectile dysfunction or premature ejaculation. Regular application of herbal creams containing clove extracts to the penis can trigger these sexual issues. [44,47]

Mesua ferrea (Burm.f.) Kosterm.

Family	**:**	Guttiferae.
English name	:	Mesua, Iron wood tree.
Sanskrit name	**:**	Nagapuspah, Nagakesarah.
Tamil name	**:**	Nagapppu, Nanku.

Habitat:

Common on the Eastern Himalayas, East Bengal and Assam, Eastern Ghats and Western Ghats upto about 5000 feet , Burma and the Andamans; it is cultivated in gardens. [15]

Parts Used:

Flowers, Oil.

Properties and uses:

The flowers are astringent, bitter, acrid, mildly heating, anodyne, sudorific, digestive, carminative, constipating, anthelmintic, diuretic, alexipharmic, expectorant, stomachic, haemostatic, aphrodisiac, febrifuge and cardiotonic. They are useful in vitiated conditions of pitta and vata, asthma, cough, hiccough, halitosis, leprosy, scabies, dermatopathy, pruritus, pharyngodynia, vomiting, dysentery, haemorrhoids, ulcers, burning sensation of feet, dipsia, impotency, leucorrhoea, haemoptysis, strangury, cephalalgia, fever and cardiac debility.

Medicinal Uses:

Dried flowers powdered and mixed with ghee or a paste made of flowers with addition of butter and sugar are given in bleeding piles as well as dysentery with mucus. They are also useful in thirst, irritability of the stomach, excessive perspiration, cough with much expectoration, dyspepsia etc. Leaves and flowers are used in scorpion-stings. Syrup of the flower – buds is given for the cure of dysentery. Powdered flowers mixed with old clarified butter that has been washed a hundred times in water are said to be an effectual application in burning of the feet. The same is applied with much benefit to bleeding piles. [40]

Administering 500mg of dried and powdered flower of Nageshwar, with a little curd and water, once daily for a week, controls leucorrhea.

Taking 750mg powder of dried flowers of Nageshwar, twice daily for three days, controls fever.

Applying hot poultice of pasted flower of Nageshwar on swollen and painful arthritic joints of limbs subside swelling and removes pain.

The seeds yield Oil. It is used to treat rheumatism and skin diseases.

No known toxicological evidence is found in literature regarding this herb. [33]

Withania somnifera (Linn) Dunal.

Family	:	Solanaceae
English name	**:**	Winter cherry.
Sanskrit name	**:**	Asvagandha, Varahakarni.
Tamil name	**:**	Amukkira, Amukkirakkilangu.
Distribution	**:**	In the drier parts of India, in waste places also Cultivated.
Parts used	**:**	Roots, Leaves.

Phytochemical constituents:

Root :

The roots are reported to contain alkaloids, amino acids,steroids, volatile oil, starch, reducing sugars, glycosides, hentriacontane, dulcitol, withaniol, an acid (m.p. 280-283 decomp.), and a neutral compound (m.p. 294-296). Many biochemically heterogeneous alkaloids have been reported in the roots. Basic alkaloids include cuscohygrine, anahygrine, tropine, pseudotropine, anaferine, isopelletierine, withananine, withananinine, pseudo-withanine, somnine, somniferine, somniferinine. Neutral alkaloids include 3-tropyltigloate and an unidentified alkaloid. Other alkaloids include withanine, withasomnine, and visamine. Withanine is sedative and hypnotic (Khare, 2007). Withasomnine has been separated from the roots of the plant grown in West Germany. Visamine is a new alkaloid which has been separated from the roots of the plant grown in Soviet Union. It prolonged hexanal-induced sleeping time and showed hypothermic and nicotinolytic effects in mice (Rastogi *et al.,* 1998).The free amino acids identified in the root include aspartic acid, glycine, tyrosine, alanine, proline, tryptophan,glutamic acid, and cystine (Khare, 2007).[15]

Properties and uses:

The tuberous roots are astringent, bitter, acrid, somniferous, thermogenic, stimulant, aphrodisiac, diuretic and tonic. They are useful in vitiated conditions of vata, leucoderma, constipation, insomnia, tissue-building and nervous breakdown.

The root is regarded as tonic, alterative, and aphrodisiac, and is used in consumption, emaciation of children, debility from old age, rheumatism, etc. It has also narcotic, diuretic, and deobstruent properties.

Rajputs regard the root as useful in rheumatism and dyspepsia. In the Punjab, it is used for lumbar pains and considered aphrodisiac. In Sind, it is used to cause abortion.

The ground root and bruised leaves are employed as a local application to carbuncles, ulcers and painful swellings. The leaves are very bitter, and are given in infusion in fevers. The fruit is diuretic.

The sutos use a decoction of the root for colds and chills, while Transvaal Sutos administer it to tone up the uterus in women who habitually miscarry and in order to remove retained conception products. The Sutos also take an infusion of the bark for asthma and apply an ointment of the leaf to bed-sores.

An enema of the decorticated root is given by the Zulus to feverish infants. They regard the plant as a specific for gangrenous rectitis, using an infusion of the root as an enema. They also use the plant in treating syphilis, and successfully employ the leaf in the healing of sores.

It is considered a tonic and aphrodisiac by the Indian physicians who use it in general debility, rheumatism, consumption, and loss of appetite. A patient with chronic gastritis and marked loss of appetite and general debility was given a full course of the powdered root alone for a few weeks without any benefit. He was then put on this and *Argyria spinosa* which is considered a very good tonic, with the same negative result. A woman with hectic fever of tubercle and marked general weakness was put on the same combination. The result was disappointing.

The root in combination with other drugs is prescribed for snake- bite (charaka, yogaratnakara) and scorpion-sting (charaka). [40, 24]

Recent research about Withania somnifera:

Anti-inflammatory Activity:

Asvagand (*Withania somnifera*) has been shown to possess anti-inflammatory property in many animal models of inflammations like carrageenan-induced inflammation, cotton pellet granuloma and adjuvant-induced arthritis (Sharma *et al*., 191, Sahni *et al*., 1994).

Anti biotic activity:

The antibiotic activity of the roots as well as leaves has recently been shown experimentally. Withaferin A in concentration of 10µg/ml inhibited the growth of various Gram-positive bacteria, acid-fast and aerobic bacilli, and pathogenic fungi.

Immunomodulatory Activity:

Asvagand showed a significant modulation of immune reactivity in animal models. Administration of Asvagand was found to prevent myelo-suppression in mice treated with three immunosuppressive drugs viz. cyclophosphamide, azathioprin, and prednisolone. Treatment with Asgand was found to significantly increase Hb concentration, RBC count, platelet count, and body weight in mice (Ziauddin *et al*., 1996).

Anti-ageing Effect:

Double-blind clinical trial carried out to study the effect of plant on prevention of ageing in 101 normal healthy males in 50-59 years age group. Root powder (0.5 g) was given orally three times a day for 1 year. Results showed statistically significant increase in Hb, RBC, hair melanin, and seated stature in treated group in comparison to placebo group. Decrease in serum cholesterol was more in treated group than in placebo group (Rastogi *et al*., 1998)

No known toxicological evidence is found in literature regarding this herb.

Plumbago zeylanica Linn.

Family	**:**	**Plumbaginaceae.**
English name	**:**	**Ceylon lead-wort.**
Sanskrit name	**:**	**Angk-shika, Chitraka-vrikshaha.**
Tamil name	**:**	**Venkodiveli**

Distribution:

Throughout India, much cultivated, wild in the W. Peninsula and probably in Bengal, Malay peninsula, Ceylon – Tropics of the Old World.

Properties and uses:

The roots are Acrid, Astringent, Thermogenic, Anthelmintic, Constipating, Expectorant, Anti-Inflammatory, Abortifacient, Alterant, Antiperiodic, Carminative, Digestive, Sudorific, Narcotic, Gastric and Nervous Stimulant and Rejuvenating. They are useful in Dyspepsia, Colic, Inflammations, Cough, Bronchitis, Helminthiasis, Haemorrhoids, Elephantiasis, Chronic and Intermittent Fever, Leprosy, Leucoderma, Ring-Worm, Scabies, Hepatosplenomegally, Amenorroea, Odontalgia, vitiated conditions of vata and kapha and anaemia. [40]

The root of *Plumbago zeylanica* is said to increase the digestive power,to promote the appeite, and to be useful in Dyspepsia, Piles, Anasarca, Diarrhoea, Skin Diseases, etc. For external administration, it is made into a paste with Milk, Vinegar or Salt and Water. Such a paste may be applied externally in leprosy and other skin diseases of an obstinate character, and be allowed to remain until a blister has formed.

A Tincture of the Root-Bark has been employed as an Antiperiodic. It acts as a powerful Sudorific.

The milky juice is used as an application to unhealthy ulcers and in cases of scabies.

A compound powder consisting chiefly of *Plumbago zeylanica*, *Hydrocotyle asiatica*, and *Acorus calamus* was administered for a considerable length of time to two cases of hemiplegia without any benefit.

1. The active principle is plumbagin and the pharmacological actions of the plant are due to the presence of this neutral principle.

2. Externally it s a strong irritant and has a powerful germicidal action on bacteria and unicellular organisms.
3. The principal action of plumbagin is on the muscular tissue which it stimulates in smaller doses and paralyses in larger ones.
4. It stimulates the contraction of the muscular tissue of the heart, intestines and uterus. The action is deep-seated.
5. It stimulates the secretion of sweat, urine, and bile.
6. It has a stimulant action on the nervous system. Thus the use of *Plumbago zeylanica* in indigenous medicine as a rubefacient, vesicant, local ecbolic, and sudorific, has a rational basis.[15]

Toxicity of root bark of *Plumbago zeylanica*:

Plumbago zeylanica is used by the physicians for the preparation of various medicines.

If the root bark of *Plumbago zeylanica* is ground and applied on the skin, it causes ulcerative dermatitis with erythroderma. It consumed in excess gastritis and retrosternal burning sensation occur. It also causes death. [15]

Antidote:

- Cow's ghee is given.
- Blackgram vada prepared from gingelly oil is given.
- A decoction of *Luffa acutangula* and *Cyperus rotundus* can also be used as an antidote.

நாட்டாய் கொடிவேலி நலவேர் தனக்குநீ
கூட்டாய் நறுநெய்யைக் கூசாமல் - வாட்டமிலா
மாட மரைத்ததனை மாதே திலநெய்யில்
போட்டுவடை யாக்கிப் புசி. [44]

(அகத்தியர் விடப்பிரதி விடத்திரட்டு)

Nardostachys jatamansi DC.

Family : Valerianaceae.

English name : Spikenard.

Sanskrit name : Jatamamsi, Mamsi.

Tamil name : Jatamasi.

Habitat:

The herb is growing at great elevations up to 17,000 feet on the Alpine Himalayas, in Nepal, Nhutan and Sikkim.

Parts Used:

Roots.

Constituents:

A volatile essential oil, resin, sugar, starch, bitter extractive matter and gum.

Action:

Root is of somewhat bitter taste, aromatic, antispasmodic, diuretic, emmenagogue, nerve sedative, nerve stimulant, tonic, carminative, deobstruent; sedative to the spinal cord; promotes appetite and digestion.

The roots are acrid, bitter, with a flavor; fattening, tonic, cooling, antipyretic, alexipharmic; cure, "Tridosha" , "kapha" , biliousness, disease of the blood, burning sensation, erysipelas, leprosy, skin discases, throat troubles, ulcers; improve the complexion.

The roots are aromatic and bitter in taste. They are supposed to possess tonic, stimulant, and antispasmodic properties, and are often employed in the treatment of epilepsy, hysteria, and convulsive affections. Used for remedy in palpitation of the heart.

This plant is said to possess all the properties of the officinal Valerian. It is said to be antispasmodic and useful in intestinal colic. It enters into the composition of a compound powder which is burnt and used for inhalation in bronchial affections.

A tincture of it was used in the out-patient department in intestinal colic and flatulence, and found to give relief in those complaints.

The rhizome in combination with other drugs is prescribed in snake-bite and scorpion-sting.

In snake bite the rhizome is ground with water and applied to the eyes in stupor and coma. It is given internally in powder form or as a decoction.

RESEARCH ABOUT *Nardostachys jatamansi*:

Jatamansi has been used in the treatment of many diseases and has several activities including anticonvulsant activity, antiparkinson's activity, tranquillizing activity, hepatoprotective, neuroprotective, hypotensive, anti-diabetic activity.

TOXIC EFFECT OF *Nardostachys jatamansi*:

Ethanol extract of the roots of *Nardostachys jatamansi* was studied for its anticonvulsant activity and neurotoxicity, alone and in combination with phenytoin in rats. The results demonstrated a significant increase in the seizure threshold by *Nardostachys jatamansi* root extract against maximal electroshock (MES) seizure model as indicated by a decrease in the extension/flexion (E/F) ratio. However, the extract was ineffective against pentylenetetrazole (PTZ) induced seizures. *Nardostachys jatamansi* root extract aso showed minimal neurotoxicity against rotarod test at doses that increased the seizure threshold.

Cinnamomum camphora (L.) J.Presl

Family : Lauraceae.

Local names : Camphor tree, Kapur, Karpurah, Karpur.

A word of caution:

Camphor, a strong chemical, interferes with various physiological processes if one exceeds proper dozes. In no case, one should exceed an intake of 60 mg of camphor daily. [33]

Traditional formulations:

- Giving water, obtained by dousing 50-60gm of camphor in one cup of water, in three small doses, removes unconsciousness caused due to too much drinking or due to some other reasons.
- Taking 25mg of camphor with two teaspoonfuls juice of pan leaves twice daily for three days, cures impotence.
- Taking 15mg of camphor with two teaspoonfuls of juice of betel leaves, cures body ache, headache caused due to influenza.
- Taking 15mg of camphor with a little hot milk, twice or thrice daily, for three days, controls excessive sexual desire.
- Taking 15mg of camphor with one teaspoonful juice of tuber of *Cyperus rotundus*, once daily early in the morning, on empty stomach for three days, controls problems due to tape worms and expels them.
- Applying camphor with little amount of ghee on bleeding wounds and tying it stops bleeding immediately. Such application would guard against wound turning septic. This shall also reduce the pain.
- Applying 10mg of camphor, mixed with a small quantity of latex of vat (*Ficus bengalensis*) on eyelids, by way of mild massaging, cures conjunctivitis.
- Massaging the painful arthritis joints with camphor, mixed in ghee or mustard oil, reduces the inflammation.
- Smelling a poultice of camphor, controls watery nose. A mixture of camphor and powdered *Nigella sativa,* when smelled, controls, both, water nose and headache accompanying it. [33]

TOXICITY OF CAMPHOR

Camphor occurs in nature in its dextrorotatory form, while the levorotatory form exists only as a synthetic form. The two enantiomers present different profiles of toxicity.

The oral administration of acute doses of D-camphor to rats and rabbits caused pronounced signs of toxicity. In rats the consume o food was reduced proportionally to the administered dose, starting from 464 mg/kg body weight/day, and at 1000 mg/kg body weight/day convulsions and piloerection were observed, connected with a reduction of motility and weight gain. Reduced body weight gain and food consumption were observed in rabbits treated with 681 mg/kg body weight/day (Leuschner, 1997).

Camphor showed porphyrogenic activity in primary cultures of chinck embryo-liver cells, with enhanced porphyrin accumulation ranging from 5-20 folds (Bonkovsky et al., 1992).

The main problems about camphor toxicity in humans are connected more to the large availability of camphor containing products and their diffused perception as unhazardous medicines rather than in the intrinsic toxicity of camphor. The daily maximum human therapeutic dose is in fact approximately 1.43mg/kg which corresponds to a therapeutic ratio of more than 450 for the endpoint toxicity, reflecting a wide margin of safety (Leuschner, 1997). On the other side, as mentioned above, camphor is present in several over the counter prodects, its use as a familiar remedy is commonly accepted, but still some lack of information persists among the consumers. Cases of camphor intoxication in humans, especiall children, are relatively frequent, mostly because of accidental ingestion (Siegel and Wason, 2986). More than 100000 cases of ingestion exposures to camphor containing products were registered between 1990 and 2003 (Maoguerra et at., 2006), causing a range of symptoms that comprises convulsion, lethargy, ataxia, severe nausea, vomiting and coma (Koppel et al., 1988: Manoguerra et al, 2006).

Reproduction toxicity

Doses up to 1000mg/kg body weight/ day to rats and up to 681mg/kg body weight/day to rabbits showed no teratogenic effects and inn none of the animals were observed higher rates of mutations or malformations (Leuschner, 1996).

Mutagenicity and cancerogenicity

In a Salmonella/microsome assay, the upper limit of the dose interval tested for camphor resulted to be the highest non-toxic dose, suggestion that the compound is not mutagenic in the Ames test (Gomes-Carneiro et al., 1998). A single dose of camphor (0.5µM. g^{-1}) administered 30, 45 or 60 minutes before gamma radiation significantly reducd the frequency of sister chromatid exchanges in mouse bone marrow, showing therefore a radiomodifying influence (Giel et al., 1989).

SUGAR

Sugar (or sucrose) is a carbohydrate. Sucrose is made up of two simpler sugars, fructose and glucose.

Granulated sugars go through a refining process its called “empty calories” because they offer no nutritional value. In addition, they are addictive and rob your body of energy and health.

Dangers of consuming sugar:

- Feeds candida.
- Promotes wrinkling and aging skin.
- Makes your blood acidic.
- Can lead to osteoporosis and arthritis.
- Rots your teeth.
- Raises your blood sugar level.
- Contributes to obesity.
- Is addictive (almost as much as drugs).
- Can create the urge to binge.
- Provides ‘empty calories’ with no nutritional value.
- Contributes to diabetes.
- Robs your body of minerals.
- Contributes to heart problems.
- Can cause cancer.
- Contributes to ulcers.
- Can cause gallstones.
- Contributes to adrenal fatigue.
- Can suppress your immune system.
- Raises the level of neurotransmitters called serotonin.
- Weakens eyesight.
- Can contribute to eczema

HONEY

Chemical composition of honey:

Honey is a mixture of carbohydrates, proteins, amino acids, vitamins, minerals, antioxidants and other compounds. It contains a number of enzymes, including invertase, glucose oxidase, catalase, and acid phosphorylase. Honey also contains eighteen free amino acids, the most abundant of which is proline.

It contains trace amounts of the vitamins $B_{2,}$ B_4, B_5, $B_{6,}$ B_{11} and vitamin C. Minerals like calcium, iron, zinc, potassium, phosphorous, magnesium, selenium, chromium and manganese are also found in honey. The main group of antioxidants in honey are the flavonoids, of which, pinocembrin is unique to honey and bee propolis. Naturally darker honey has greater antioxidant properties.

Acetic, butanoic, formic, citric, succinic, lactic, malic, pyroglutamic, gluconic acids, and a number of aromatic acids are found in honey. Bee's honey is free of cholesterol.[45]

Properties according to modern science:

Experiments and studies on honey have shown that honey is antiseptic, antimicrobial, antipyretic, anti-inflammatory, anti allergent, antitoxic, sedative, laxative, anti anemic, antioxidant, healing and cleansing, moisturizing and blood-purifying. It promotes rehydration, easily digestable, stimulates immunity, and is beneficial for all types of skin diseases.[45]

Value of honey in diabetes mellitus:

Honey is beneficial for diabetic patients in two ways. One is honey being three times sweeter then sugar, one may need a much smaller quantity of honey as a sweetener and, honey contains lesser calories than sugar. The other is, by providing vitamins and minerals. [45]

Medicinal uses of honey:

- Stress/fatigue: 15ml of honey orally to reduce stress and fatigue.
- Weakness: 15ml of honey and fruit juice of *Punica granatum* twice a day before meals.
- Sleep disturbance: Intake of 15ml of honey leads to sound sleep.

- Eyesight: 10ml of honey mixed with 10ml of carrot juice and consumed regularly will improve eyesight.
- Bad breath: 5g of powdered cinnamon bark and 5ml of honey mixed with water and use as a mouth wash.
- Teething pain: Massage gums gently with honey. Should not use in children below one year.
- Sore throat: 5ml of honey and 10 ml of lime juice is mixed and given. Swallow the concoction every few hours until symptoms clear up. Add a pinch of black pepper to increase blood circulation to the throat.
- Cold and cough: Mix 10ml if honey with equal quantity of ginger juice and consume twice a day.
- Bronchial asthma: A mixture of 2.5g if black pepper powder, 5ml each of honey and juice of ginger consumed thrice daily help to relieve the symptoms of asthma.
- Hiccough: 5ml of honey is mixed with 10ml of breast milk.
- Stomach ulcers: 5ml of new honey diluted in 10ml of water and given twice a day before meals.
- Vomiting: 2.5g each of powder of fruit of piper longum and popped rice is grond with 15ml of honey and given orally as an antiemetic.
- Dehydration: Fresh honey diluted in water is given to rehydrate.
- Diarrhoea: Drink 5ml of old honey thrice a day before meals.
- Diarrhoea/Dysentery: 15ml of honey mixed with 120ml of decoction of tubers of *Cyperus rotundus* is given in treatment of diarrhea and dysentery.
- Bed-wetting: Give 5ml of old honey daily just before going to bed.
- Polyuria: 5ml of honey, 20ml of fresh juice of fruits of *Phyllanthus emblica* and 6g of pulp of *P. emblica* are mixed together and consumed twice a day.
- Diabetes mellitus: 5ml of honey mixed with a pinch of powdered seeds of *Gossypium herbaceum* and is given to reduce blood sugar in diabetic patients.
- Hypertension: Daily intake of 10ml of honey mixed with 5ml of garlic juice helps to control blood pressure.
- Hemiplegia: 240ml of honey is dissolved in 960 ml of water and is boiled down to total volume of 960ml. In Unani system of medicine this is known as Mavul Asal.

- Obesity: one glass of warm water taken with 10ml of honey and 5ml of lemon juice in early morning reduces fat and purifies blood.
- Burns: Apply fresh bee's honey directly.
- Cut and wounds, eczema: Apply honey on cuts and wounds, eczema.
- Burning sensation in the body and thirst: Unpolished rice is washed with water and 100ml of this water is taken. 15ml of bee's honey, 5g of sugar and 10g of powder of stem of *Santalum album* are added to this and mixed well. This mixture is given twice a day after meals.
- Jaundice and bleeding disorders: 15ml of honey mixed with 120ml of fresh juice of *Adathoda vasica*, is given twice a day in treatment of jaundice and bleeding disorders.
- Relieve from hangover: Mix 10ml of honey with half a cup of orange juice and half a cup yogurt. Blend them properly and drink.
- Morning sickness: 15ml of honey before breakfast.
- Subfertility due to lack of semen: Add 5ml of honey before breakfast.[45]

TOXIC COMPOUND IN HONEY:

Honey may contain compounds that may lead to toxicity. A compound naturally present in honey, named 5-hydroxymethylfurfural, may be formed during the heating or preservation processes of honey (HMF). HMF is compound that may be mutagenic, carcinogenic and cytotoxic. It has also been reported that honey can be contaminated with heavy metals such as lead, arsenic, mercury and cadmium.

Honey produced from the nectar of *Rhodondendron ponticum* contains alkaloids that can be poisonous to humans, while honey collected from Andromeda flowers contains grayanotoxins, which can cause paralysis of limbs in humans and eventually leads to death.

In addition, *Melicope ternata* and *Coriaria arborea* from New Zealand produce toxic honey that can be fatal.

There are reports that honey is not safe to be consumed when it is collected from Datura plants, belladonna flowers and *Hyoscamus niger* plants, *Serjania lethalis*, *Gelsemium sempervirens*, *Kalmia latifolia*, *Tripetalia paniculata* and *Ledum palustre.* Although the symptoms of poisoning due to honey consumption may differ depending on the source of toxins, most common symptoms generally include dizziness, nausea,

vomiting, convulsions, headache, palpitations or even death. It has been should not be considered a completely safe food.

Infants fewer than one year old should not consume honey as their digestive systems are not fully developed and will be at risk of contracting botulism. Since honey mainly contains free sugars like fructose and glucose, and sugars provide energy for the body but have no other nutritional value, excessive intake of honey should be avoided.[50]

4. MATERIALS AND METHODS

WORK PLAN:

- ✓ **LITERATURE REVIEW OF DRUG**
- ✓ **COLLECTION OF RAW DRUGS**
- ✓ **IDENTIFICATION AND AUTHENTICATION**
- ✓ **PURIFICATION OF RAW MATERIALS**
- ✓ **PREPARATION OF PATTAI CHOORANAM**
    - o **QUALITATIVE ANALYSIS**
        - ▪ **PHYSICOCHEMICAL ANALYSIS**
        - ▪ **MICROBIAL LIMIT TESTS**
        - ▪ **BIOCHEMICAL ANALYSIS**
        - ▪ **PHYTO CHEMICAL ANALYSIS**
    - o **QUANTITATIVE ANALYSIS**
        - ▪ **FTIR**
        - ▪ **ICP OES**
        - ▪ **XRD**
        - ▪ **SEM**
- ✓ **TOXICOLOGICAL ANALYSIS**
        - ▪ **ANIMAL EXPERIMENTS**
- ✓ **STATISTICAL ANALYSIS**

COLLECTION OF RAW DRUGS

Ingredients of pattai chooranam:

- Parangipattai : Tuber of *Smilax china*
- Nellikkai ganthagam : Mineral
- Sathikai : Seeds of *Myristica fragrans*
- Sathipathiri : Aril of *Myristica fragrans*
- Lavangam : Dried flower buds of *Syzygium aromaticum*
- Sirunagapoo : Flower buds of *Mesua ferrea*
- Amukkara kizhangu : Root tuber of *Withania somnifera*
- Kodiveli verpattai : Root bark of *Plumbago zeylanica*
- Sadamanjil : Root of *Nardostachys jatamansi*
- Pachaikarpooram : Resin of *Cinnamomum camphora*
- Seeni : *Saccharam officinarum*

All the raw materials except ganthagam in the pattai chooranam were procured from Vallalar Nattu Marunthu Kadai, Melaratha Street, Tirunelveli Town, tirunelveli - 627006. Ganthagam was procured from Narasimma Raja Nattu Marunthu Kadai, 46, Melamaada Veedhi, Tirunelveli Town.

IDENTIFICATION AND AUTHENTICATION:

All raw drugs were identified and authenticated by the experts of Gunapadam (pharmacology) and Medicinal botany department in Government Siddha Medical College, Palayamkottai, Tirunelveli.

PURIFICATION OF RAW MATERIALS

Figure 1:PURIFICATION METHODS

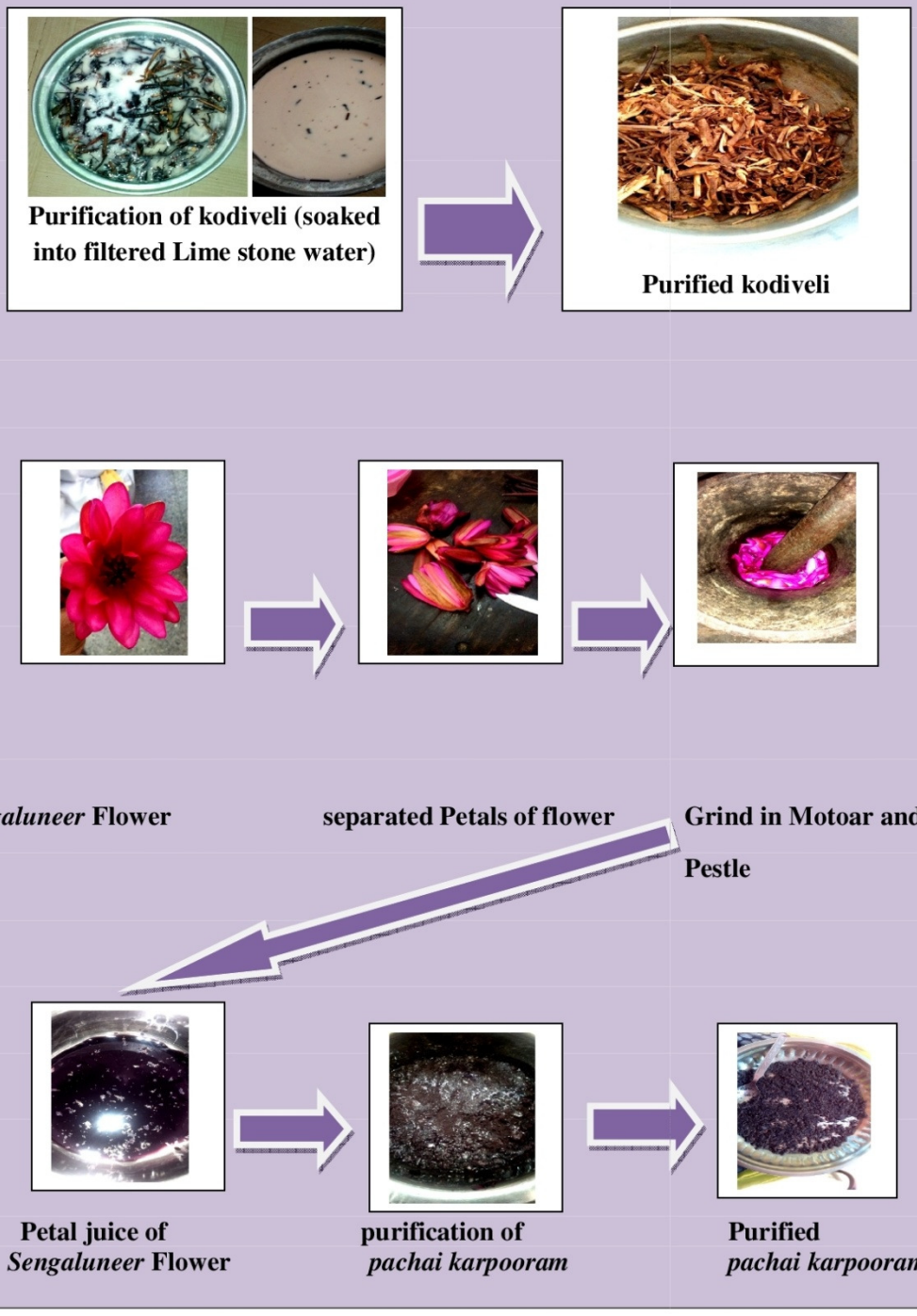


Figure 2: continuation of purification of raw materials

Ganthagam melting

with Cow's Butter

Molten ganthagam

Molten ganthagam

Poured into Cow's Milk

till ganthagam

get solid

Purified ganthagam

Sadamanjil

Sadamanjil

Wash with water

Purified sadamanjil

PURIFICATION OF PARANGIPATTAI AND AMUKKARA KIZHANGU:

Purification method of parangipattai and amukkara kizhangu was same method. The above ingredients chopped into small pieces separately. Then equal quantity of Milk and Water was poured in a mud vessel. The mouth of the mud vessel was closed by tying a suitable pure and white cloth around. The chopped bits of raw drug were put on the cloth and the same was closed with a suitable mud pan. The joint was sealed around with a wet cloth to prevent the leakage of steam. Then the mud pot was put on fire for a period until 3/4th of the milk is evaporated. Thus raw drug was purified by the steam of milk and water. Then the pieces of raw drug were dried in the sun.

PURIFICATION OF LAVANGAM, SIRUNAGAPOO, SADAMANJIL, SATHIKAI, SATHIPATHIRI:

Purification method of above ingredients was same.

Above mentioned raw material was cleaned using water and allowed to dry.

PURIFICATION OF PACHAI KARPOORAM:

Powdered *pachaikarpooram* was soaked in *sengaluneer* petal juice for 24 minutes and allowed to get dried in sunlight.

PURIFICATION OF KODIVELIVERPATTAI:

The root was soaked in limestone water for 3hours then wash with fresh water and allowed to get dried in sunlight.

PURIFICATION OF NELLIKAI GANTHAGAM:

Purification of ganthagam is melting with Cow's Butter from authenticated text reference. Molten ganthagam poured into Milk containing Mud Pot then Cool it till solidified ganthagam in milk. This process was repeated for 30 times.

PREPRATION OF PATTAI CHOORANAM:

All the purified raw materials were powdered separately and sieved using white cotton cloth then all to mix together. Final preparation is stored in an air tight container.

ADJUVANT OF RESEARCH DRUG – PATTAI CHOORANAM

Honey

DOSAGE

1 ½ Varagan to 2 ½ Varagan (6.3mg – 10.5mg)

Twice a day, After meals, 24-48 days.

INDICATIONS

Megavayu – flatulency caused in the body by venereal heat.

Megavooral – Itching caused by venereal affection

Soolai – the joints of the limbs are specially swollen and attended with boils and itching.

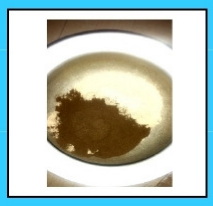
Pramegam – vellai - Gonorrhoea

REFERENCE

Anupooga vaidya navaneetham, Part-09, Hakeem P. Mukammathu Abdulla Saahyu, first Edition-1975, Arulmihu Sri Thandayuthapaani Thirukovil, pg no: [59].

Figure 3: PURIFICATION OF CHOORANAM

Parangipattai powder



Sadamanjil powder

Lavangam powder

Sathipathiri powder

Sathikai powder

Amukkara kizhangu powder

Kodiveli powder

Sirunagapoo powder

Mixed powder

Mixed with milk poured in a pot

Milk and water

Cloth tie around the mouth of pot

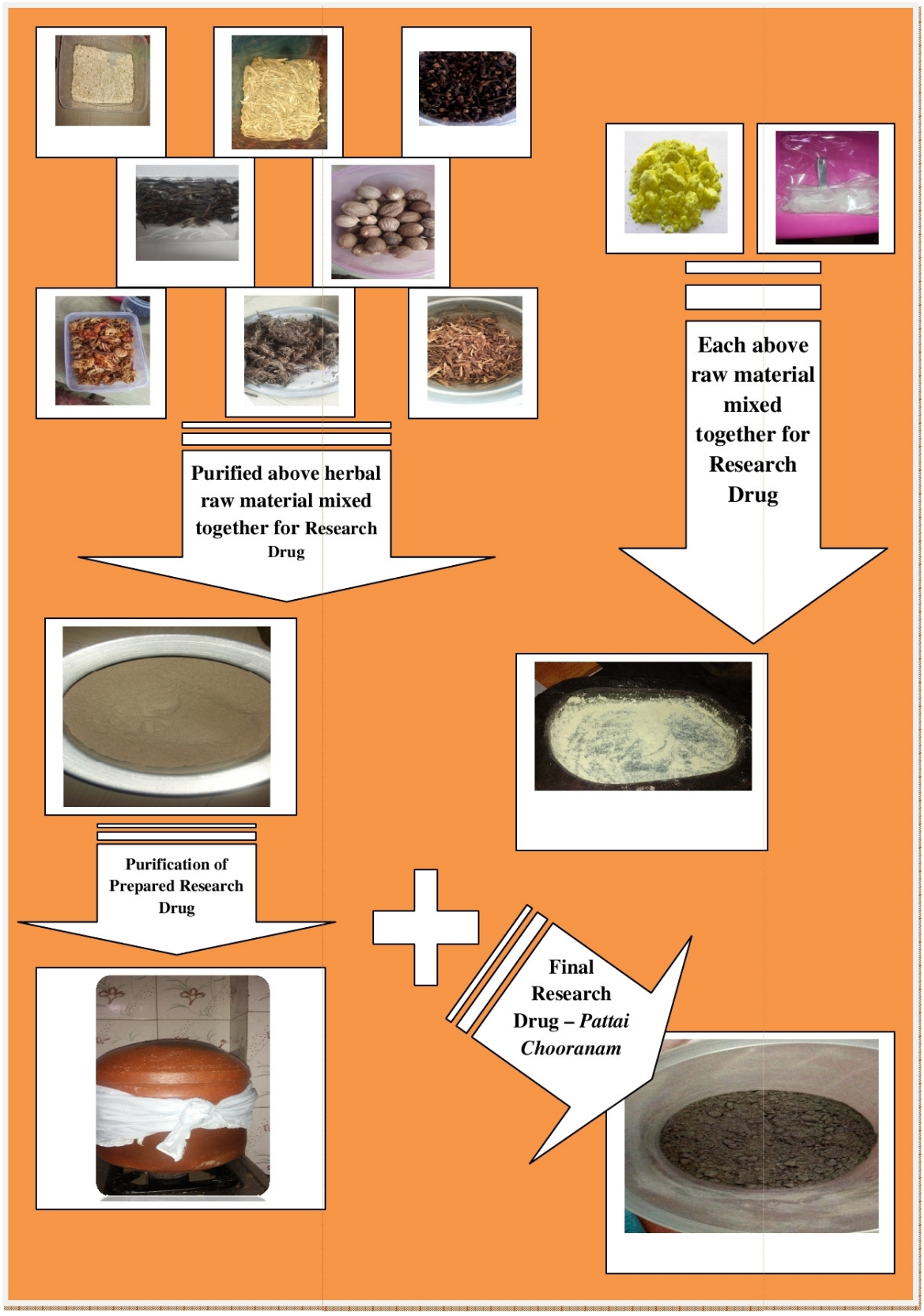
Mixed powder Put on the cloth

Pittaviyal process

After pittaviyal process

Final product

Figure 4: PREPARATION OF PATTAI CHOORANAM



QUALITATIVE ANALYSIS

PHYSICOCHEMICAL ANALYSIS

COLOUR

About 50g of sample was taken in a clean glass beaker and tested for its colour by viewing again a white opaque background under direct sunlight.

pH

The pH of sample was estimated as per the method prescribed in Indian Standard (IS) -6940 (1982). One gram of sample was taken into a 100ml graduated cylinder containing about 50ml of water and filled upto the mark with water. The cylinder was stopped and shaken vigorously for two minutes and the suspension was allowed to settle for an hour at 25^0 to 27^0. About 25ml of the clear aqueous solution was transferred into a 50ml beaker and tested for pH using DIGISUN digital pH meter (DIGISUN Electronics, Hyderabad, India).

DETERMINATION OF WATER SOLUBLE ASH

25ml of water was added to the gooch crucible containing 1g of sample and boiled for 5minutes. Insoluble matter in a sintered glass crucible is collected, washed with hot water and ignited in a crucible for 15minutes at a temperature not exceeding 450^0C. The difference between the weight of the insoluble matter and weight of the ash represents the water soluble ash.

ACID INSOLUBLE ASH

The ash is boiled for 5minutes in 25ml of 1:1 dil HCL. Insoluble matter in sintered glass crucible is collected, washed with hot water an ignited in a crucible. This is then collected in a desiccators and percentage of acid insoluble ash was calculated the with reference to the air dried drug.

LOSS ON DRYING

Five grams of sample is heated in a hot oven at 105^0C for 1hour and the percentage of loss of weight was calculated.

Determination of Alcohol Soluble Extractive

Macerate 5 g of the air dried drug, coarsely powdered, with 100 ml of Alcohol of the specified strength in a closed flask for twenty-four hours, shaking frequently

during six hours and allowing to stand for eighteen hours. Filter rapidly, taking precautions against loss of solvent, evaporate 25 ml of the filtrate to dryness in a tarred flat bottomed shallow dish, and dry at 105º, to constant weight and weigh. Calculate the percentage of alcohol-soluble extractive with reference to the air-dried drug.

Determination of Water Soluble Extractive

Proceed as directed for the determination of Alcohol-soluble extractive, using chloroform water instead of ethanol.

Physico chemical analysis was done in SAIF, IITM, Chennai – 36.

MICROBIAL LIMIT TESTS

Evaluation of Total Aerobic Bacterial Count

1.1. Preparation of Sample for Experimental Work

Weighed 10 gm of the homogenized drug sample aseptically and dissolved in 10 ml of sterile water and made up to 100 ml with the sterile water. The insoluble drug product was suspended in 100 ml of buffered sodium chloride-peptone solution (pH 7.0).

1.2.Serial dilution of Sample

A serial dilution is the dilution of a sample, in 10-fold dilutions. From the sample, 1 ml of the sample was added to 9 ml of sterile distilled water and mixed it well. This dilution was denoted as 10^{-1} dilution. From this dilution, one ml was taken from that mixture is added to 9 ml, and designated as 10^{-2} dilution. The same procedure was repeated up to 10^{-4}.

Isolation of Total Viable Aerobic Microbial Count

1.1. Isolation of Bacteria by Plate Count Method

In this test, the bacteria in sample were made to grow as colonies, by inoculating a known volume of sample into a solidifiable nutrient medium (Casein Soybean Digest agar or Nutrient agar medium) in petridish. The agar plate was prepared by mixing growth medium with agar and then sterilized by autoclaving. Once the agar was cooled to 45^{o}C, approximately 15 to 20 ml of medium was poured into a sterile Petri dish under aseptic condition and left to solidify for 15 minutes. After solidification, each plate was smear with 0.1 ml of sample from the dilution of

10^{-1} and 10^{-2}. After inoculations, all the plates were incubated at 37°C for 24 hours. After incubation, the bacterial colonies were developed as visible to the naked eye and the number of colonies on a plate was counted using Quebec Colony Counter. Plates with an average of from 30 to 300 colonies of the target bacterium were selected for colony count. Because of the statistical problems, plates with lower than 30 colonies greater than 300 colonies were rejected

1.1.1. Composition of Nutrient Agar Media

Peptone	: 5.0 gm
Sodium chloride	: 5.0 gm
Beef extract	: 1.5 gm
Yeast extract	: 1.5 gm
Agar	: 15.0 gm
Distilled water	: 1000 ml
pH (at 25°C)	: 7.4±0.2

2.2. Isolation of Fungi

From each of the above prepared samples, 0.1 ml of sample was transferred to Sabouraud Dextrose agar (SDA) prepared with Chloramphenicol. The plates were then incubated for 5 days at room temperature (20 to 25°C). After incubation, the fungal colonies were observed and calculated.

2.3. Composition of SDA

Dextrose	: 40 gm
Peptone	: 10 gm
Agar	: 15 gm
Distilled water	: 1000 ml

2.4. Evaluation of Specified Microorganisms

2.4.1. Isolation & Identification of *Escherichia coli*

One ml of the prepared sample was added in a sterile screw-capped container containing 50 ml of nutrient broth and mixed well. Then, it was allowed to stand for 1 hour and mixed well again. After one hour, the screw caps of the bottle was loosened and incubated at 37º for 18 to 24 hours.

2.4.2. Primary Test

From the above prepared enrichment culture, 1.0 ml was taken and transferred aseptically into a tube containing 5 ml of Mac- Conkey broth. Inoculated tubes were incubated in a water-bath at 36º to 38º for 48 hours.

2.4.3. **Secondary Test**

From the primary test, 1.0 ml of the enrichment culture was taken and transferred aseptically in to 5 ml of peptone water. It was then incubated in a water-bath at 43.5º to 44.5º C for 24 hours and observed the tubes for acid and gas. Then, the culture was subjected to biochemical tests of imvic and the results were observed and correlated.

2.4.3. Alternative test

It was done by a loop full of enriched culture in the primary test was streaked on a sterile Mac-Conkey agar medium. Then, the plates were inverted and incubated at 37 º C for 24 hours. After incubation, the pink or brick red color colonies were examined and transfer them individually into the surface of Eosin Methylene Blue agar medium (EMB), on Petri dishes. Inoculated plates were inverted and incubated at 37 º C for 24 hours. After incubation, the colonies on medium were checked for their color appearance like green metallic sheen under reflected light. The colonies were subjected to confirmation by further suitable cultural and biochemical tests.

2.4.4. Components of Eosin Methylene Blue Agar Media

Pancreatic digest of gelatin	: 10.0 g
Dibasic potassium phosphate	: 2.0 g
Lactose	: 10.0 g
Eosin Y	: 400 mg
Methylene blue	: 65 mg
Agar	: 15.0 g
Distilled water	: 1000 ml

2.4.5. Isolation & Identification of *Salmonella* sp.

One ml of the prepared sample was added in a sterile screw-capped container containing 100 ml of nutrient broth and mixed well. Then, it was allowed to stand for 1 hour and mixed well again. After one hour, the screw caps of the bottle was loosened and incubated at 37º for 18 to 24 hours.

2.4.6. Primary Test

From the above prepared enrichment culture, 1.0 ml was taken and transferred aseptically into a tube containing 10 ml of Selenite F broth. Inoculated tubes were incubated in a water-bath at 36º to 38º for 48 hours. After incubation, the culture was subcultured on two of the agar media namely Bismuth sulphate agar and Deoxy cholate citrate agar and incubated the plates at 36º to 38º for 18 to 24 hours. After incubation, colonies were observed on the medium and confirmed the genus *Salmonella* based on guidelines.

2.4.7. Secondary test

The suspected colonies of the primary test were subcultured on the slant of triple sugar-iron agar in test tube and in urea broth. Both media were incubated at 37ºC for 24 hours. After incubation, the results were observed according to the development of color change and acid / gas in media. The presence of Salmonella was confirmed by agglutination tests.

2.4.7.1. Composition of *Salmonella Shigella* Agar Media

Beef Extract	: 5.0 gm
Enzymatic Digest of Casein	: 2.5 g
Enzymatic Digest of Animal Tissue	: 2.5 gm
Lactose	: 10 gm
Bile salts	: 8.5 gm
Sodium Citrate	: 8.5 gm
Ferric Citrate	: 1.0 gm
Brilliant Green	: 0.00033 gm
Neutral Red	: 0.025
Agar	: 13.5 gm
Distilled water	: 1000 ml

2.4.8. Isolation and Identification of *Pseudomonas aeruginosa*

From the above prepared enrichment culture, 1.0 ml was taken and transferred aseptically into 100 ml of fluid soyabean-casein digest medium and mixed well. The inoculated tubes were incubated at 37º C for 24 hours. After incubation, the growth of bacteria was checked. From this, a loop full of culture was streaked on the surface of

Cetrimide agar medium and Pseudomonas Isolation Agar medium and incubated at incubated at 37º C for 24 hours. After incubation, the colonies from the agar surface of these two media were checked for detection of fluorescein and pyocyanin.

2.4.8.1 Composition of Cetrimide Agar Media

Pancreatic digest of gelatin	: 20.0 g
Magnesium chloride	: 1.4 g
Potassium sulphate	: 10.0 g
Cetrimide	: 0.3 g
Agar	: 13.6 g
Glycerin	: 10.0 g
Distilled Water t	: 1000 ml

2.4.9. Isolation and Identification of *Staphylococcus aureus*

From the above prepared enrichment culture, a loop full of culture was taken and transferred aseptically on Mannitol salt agar and incubated at 37º C for 24 hours.. After incubation, the colonies were subjected to confirmation by hem agglutination test.

2.4.9.1. Composition of Mannitol Salt Agar Media

Pancreatic digest of gelatin	: 5.0 g
Peptic digest of animal tissue	: 5.0 g
Beef extract	: 1.0 g
D-Mannitol	: 10.0 g
Sodium chloride	: 75.0 g
Agar	: 15.0 g
Phenol red	: 25 mg
Distilled Water	: 1000 ml

Microbial Limit Test was done and authorized by Dr. K. Thanga mariappan, in Vivek Institute of Laboratory Medicine, Nagercoil.

BIOCHEMICAL ANALYSIS

5gms of the drug was taken in a 250ml clean beaker and 50ml of distilled water was added to it. Then it was boiled well for about 10 minutes. Then it is allowed to cool and filtered in a 100ml volumetric flask and made up to 100ml with distilled water. The extract is used for the Qualitative analysis.

TEST FOR CALCIUM:

2ml of the above prepared extract taken in a clean test tube. To this add 2ml of 4% ammonium oxalate solution and appearance of white precipitate was checked.

TEST FOR SULPHATE:

2ml of the extract is added to 5% barium chloride solution in a test tube and appearance of white precipitate was checked.

TEST FOR CHLORIDE:

The extract is treated with silver nitrate solution and appearance of white precipitate was checked.

TEST FOR CARBONATE:

The substance is treated with concentrated HCL and formation of effervescence of white precipitate was checked.

TEST FOR STARCH:

The extract is added with weak iodine solution and appearance of blue was checked.

TEST FOR FERRIC IRON:

The extract is acidified with glacial acetic acid and potassium ferro cyanide. Then appearance of blue colour was checked.

TEST FOR FERROUS IRON:

The extract is treated with concentrated nitric acid and Ammonium Thiocyanide solution. Appearance of blood red colour was checked.

TEST FOR PHOSPHATE:

The extract is treated with ammonium molybdate and concentrated nitric acid. Appearance of yellow precipitate was checked.

TEST FOR ALBUMIN:

The extract is treated with esbach's reagent and appearance of yellow precipitate was checked.

TEST FOR TANNIC ACID:

The extract is treated with ferric chloride and appearance of black precipitate was checked.

TEST FOR UNSATURATION:

Potassium permanganate solution is added to the extract and discolourisation was checked.

TEST FOR THE REDUCING SUGAR:

5ml of Benedict's qualitative solution is taken in a test tube and allowed to boil for 2 minutes and add 8 to10 drops of the extract and again boil it for 2 minutes. Colour change was checked.

TEST FOR AMINO ACID:

One or two drops of the extract is placed on a filter paper and dried well. After drying, 1% Ninhydrin is sprayed over the same and dried it well. Appearance of Violet Colour was checked.

TEST FOR ZINC:

The extract is treated with potassium ferro cyanide and appearance of white precipitate was checked.

Biochemical analysis was done in Biochemistry Lab., Govt. Siddha Medical College, Palayamkottai.

PHYTO CHEMICAL ANALYSIS

ALKALOIDS

The extract was evaporated in a test tube. To the residue dilute HCL was added, shaken well and filtered.

1. Mayer's test:

To the 2-3ml of filtrate Mayer's reagent was added. Formation of yellow precipitate showed the presence of alkaloids.

2. Dragendroff's test:

To 2mg of the ethanolic extract 5ml of distilled water was added, 2ml of Hydrochloric acid was added until an acid reaction occurs. To this 1ml of Dragendroff's reagent was added. Formation of orange or orange red precipitate indicates the presence of alkaloids.

3. Hager's test:

To 2mg of the ethaolic extract taken in a test tube, a few drops of Hager's reagent were added. Formation of yellow precipitate confirms the presence of alkaloids.

TEST FOR CARBOHYDRATES

1. Molisch Test:

2mg of ethanolic extract was shaken with 10ml of water, filtered and the filtrate was concentrated. To these 2 drops of freshly prepared 20% alcoholic solution of α naphthol was added. 2ml of conc. Sulphuric acid was added so as to form a layer below the micture. Redviolet ring appear, indicating the presence of carbohydrates which disappear on the addition of excess of alkali.

2. Legal's test:

The test is employed for digitoxose containing glycosides. The extract of drug is dissolved in pyridine, sodium nitroprusside solution is added to it and made alkaline, pink or red color is produced.

3. Borntrager's test:

Bortrager's test is employed for presences of anthraquinones. The drug is boiled with dilute sulphuric acid, filtered and to the filtrate benzene, or ether or chloroform is added and shaken well. The organic layer is separated to which ammonia is added slowly. The ammoniacal layer shows pink to red color due to presences of anthraquinone glycosides.

TEST FOR PHYTOSTEROLS

1. Liebermann-Burchard's test

2mg of dry extract was dissolved in acetic anhydride, heated to boiling, cooled and the 1ml of concentrated sulphuric acid was added along the sides of the test tube. Formation of green colour indicates the presence of steroids.

2. Salkowski test:

To 2ml of extract, 2ml of chloroform and 2ml of conc. H_2SO_4 was added. The solution was shaken well. As a result chloroform layer turned red and acid layer showed greenish yellow fluorescence.

TEST FOR FLAVANOIDS:

1. Shinoda test

To the extract, 5ml of 95% ethanol and few drops of concentrated hydrochloric acid was added. To this solution 0.5gm of magnesium turnings were added. Pink colouration indicated the presence of flavanoids.

2. Fluorescence test

Small quantity of sample drug was dissolved separately in alcohol and a drop of that extract was placed on Whatman filter paper and observed under UV light, fluroscence indicates the presence of flavanoids.

TEST FOR TANNINS

Small quantities of test drug was dissolved separately in water and tested for the presence of phenolic compound and tannins. In the process of testing and treating, the following observations were noted.

a) Dilute ferric chloride solution (5%) gives a dark green color.
b) 10% aqueous potassium dichromate solution gives yellowish brown precipitate.
c) 10% lead acetate solution gives a white precipitate. **Mukherjee, P.K. 2002**. Quality control of herbal drugs, business horizons pharmaceutical publishers, New Delhi. 356-358.

TEST FOR PROTEINS

A Small quantity of test drug was dissolved in few ml of water and the following reactions were carried out.

a) **Millon's test:** To 2ml of filtrate, few drops of Millon's reagent were added. A white precipitate indicates the presence of proteins.
b) **Ninhydrin test:** To 2ml of filtrate 2 drops of ninhydrin solution was added. A characteristic purple color indicates the presence of amino acids. (Yasma and Ichikawa, 1953)
c) **Biuret test:** To one portion of aqueous and alcoholic extract in few ml water one ml of 10% sodium hydroxide solution was added, followed by this one drop of dilute copper sulphate solution was added. No violet colour was obtained indicating the absence of protein.

TEST FOR FIXED OILS AND FATS

a) **Spot test:** A small quantity of test drug was placed between 2 filter papers. Oil stains produced with any extract shows the presence of fats and fixed oils (Harborne, 1984).
b) **Saponification test:** A small quantity of test drug was treated with few drops of 0.5N alcoholic potassium hydroxide along with 2 to 3 drops of phenolphthalein. Later the mixture is refluxed for about 2hr. Soap formation indicates the presence of fats and fixed oils.

TEST FOR LIGNIN

Phloroglucinol test:

Small quantities of test drug was dissolved separately in few ml of alcoholic solution of hydrochloric acid and phloroglucinol gives red color, which shows lignin is present.

TEST FOR SAPONINS

Frothing test:

Drug extract was shaken vigorously with water. No persistent foam was formed. (Ansari, 2006).

Phytochemical analysis was done and authorized by Dr. K. Thanga mariappan, in Vivek Institute of Laboratory Medicine, Nagercoil.

QUANTITATIVE ANALYSIS

FOURIER TRANSFORM INFRA RED (FTIR)

Few milligram of sample was mixed with KBr and pelletized using a hydraulic press. The Fourier Transform Infra Red (FTIR) spectra were recorded between 4000-400cm^{-1} in a FTIR spectrometer (Spectrum 100, perkin Elmer, USA).

INDUCTIVELY COUPLED PLASMA OPTICAL EMISSION SPECTROMETRY (ICP-OES)

Level of heavy metals such as lead, mercury, cadmium and arsenic in Pattai Choorana was measure by digestion the sample in aqua regia and analyzing using ICP-OES (Perkin, Elmer, USA).

X-RAY POWDER DIFFRACTION (XRD)

X-ray powder diffraction (XRD) us a rapid and analytical technique primarily used for phase identification of a crystalline material is finely ground, homogenized, and average bulk composition is determined.

Crystalline substances act as three – dimensional diffraction gratings for X-ray wavelengths similar to the spacing of planes in a crystal lattice. X-ray diffraction is now a common technique for the study of crystal structures and atomic spacing.

SCANNED ELECTRON MICROSCOPE (SEM)

The surface morphology of the sample was qualitatively assessed using a cold field emission scanning electron microscope (JSM 670F, JEOL, Japan). The sample was mounted on a brass stub and sputter coated with platinum and introduced into the specimen chamber. Imaging was carried out at an acceleration voltage of 3kV.

The drug pattai chooranam was analysed by FTIR, ICP-OES, XRD, SEM at Sophisticated Analytical Institute, Indian Institute of Technology, Madras.

TOXICOLOGICAL ANALYSIS

ANIMAL EXPERIMENTS

All the experimental procedures and protocols used in this study were reviewed and approved by the Institutional Animal Ethics Committee of Nandha College of Pharmacy (Reg No: 688/PO/Re/S/02/CPCSEA) and were in accordance with the guidelines of the CPCSEA. (This research IAEC No: NCP/IAEC/2018-19/22)

SELECTION OF ANIMALS

The animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of 24±2^{o}C and relative humidity of 30 – 70 %. A 12:12 light : dark cycle was followed.

SEX

Female animals were selected for acute toxicity study. Equal numbers of male and female animals were selected for subacute toxicity study.

WEIGHT

Wistar Albino rats weighing between 150 – 200 gm was used for the study. The animals were obtained from Animal House, Kerala Veterinary University, Mannuthy (Reg. No: 328/GO/Re/S/01/CPCSEA).

FOOD AND WATER

All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai).

TEST GUIDELINE FOLLOWED

OECD 423 – Acute Toxicity method

OECD 407 – Subacute Toxic Class method (repeated oral dose 28days)

NUMBER OF ANIMALS (according to OECD guidelines)

Acute Toxicity Study

18 Wistar Albino Rats divided into 6 groups, each group consisting of 3 Female Rats were used for the study.

Sub Acute Toxicity Study

24 Wistar Albino Rats, divided into 4 groups, each group consisting of 3 Male and 3 Female Rats were used for the study.

VEHICLE

Water was used as the vehicle in both studies. The drug was diluted on honey and water (5:5) with the concentration of 600mg/ml.

DOSE LEVELS

Acute toxicity study

In case of acute toxicity study, the dosage was selected as 5mg/kg, 50mg/kg, 300mg/kg, 1000mg/kg and 2000mg/kg.

Table 1: Dosing schedule for Acute Toxicity Study

Group	Group details	Drug (mg/kg) (mg/kg)concentration	Days
I	Normal Control	0	1
II	Concentration 1	5	1
III	Concentration 2	50	1
IV	Concentration 3	300	1
V	Concentration 4	1000	1
VI	Concentration 5	2000	1

Sub-Acute Oral Toxicity Study, three doses were selected based on the acute toxicity study

Table 2: Dosing schedule for subacute toxicity study

Group	Group details	Drug Concentration (mg/kg)	Days
I	Control administered only with water	0	28
II	Dose I	300	28
III	Dose II	600	28
IV	Dose III	1200	28

ROUTE OF ADMINISTRATION

The drug was administered orally using an oral gavage tube for both the studies.

BODY WEIGHT MEASUREMENT

Body weight of the animals is measured in subacute toxicity study once in a week.

BLOOD COLLECTION

The animals were sacrificed on 29th day for biochemical and histopathological studies. Prior to the sacrifice, animals were isolated in individual cages and fasted for 12 hrs, with water provided *ad libitum*.

Then, they were anaesthetized with pentobarbitone (45mg/kg, i.p) and the blood was collected by sino-orbital puncture. Blood samples for the determinations of hematological parameters (Ghai, 1995) were collected in heparinized tubes and used for the following determinations;

Hematology Analysis

- ✓ R.B.C Total count
- ✓ W.B.C Total count
- ✓ W.B.C Differential count
- ✓ Hemoglobin (gm%)

Non-heparinized tubes were used for serum biochemistry determinations. To obtain the serum, blood samples were placed at room temperature for approximately 30 min. Then, the tubes were centrifuged at 3000 rpm for 10 min and the supernatants were taken for the determinations

Biochemical Analysis

- ✓ SGOT
- ✓ SGPT
- ✓ ALP
- ✓ Urea
- ✓ Creatinine
- ✓ Creatinine phosphokinase
- ✓ Lactate dehydrogenase

Hamatology and Biochemical analysis were done in Abiroopa Clinical labs, Poondurai road, Erode.

HISTOPATHOLOGICAL ANALYSIS

After blood collection, the animals were sacrificed by cervical decapitation and the organs such as brain, heart, liver, spleen, kidney and testis & ovary were removed and weighed.

The organs were preserved in 10% buffered formaldehyde solution for histopathological observations.

Thin tissue sections were obtained from the stored samples and mounted on the glass slide.

The sections were stained with haemotoxillin & eosin and various features in the tissue sections are noted.

This histopathological analysis was done in Origin laboratory, Coimbatore.

STATISTICAL ANALYSIS

The values were expressed as mean ± SEM. The statistical analysis was carried out by one way analysis of variance (ANOVA) followed by Dunnett's 't'-test using graph pad version I. p values < 0.05 were considered significantly.

5. RESULTS

QUALITATIVE ANALYSIS

1. PHYSICO-CHEMICAL ANALYSIS

The physic-chemical parameters of Pattai chooranam (PC) are displayed below.

Table 03— Qualitative analysis Physicochemical parameters of Pattai chooranam

Parameters	Total ash	Values
Ash value	Water soluble ash Acid insoluble ash	7.65±0.011 0.85±0.011
Extractive value	Ethanol soluble extractive value Water soluble extractive value	8.10±0.310 9.10±0.310
Loss on drying pH Analysis	Loss on drying at 70°C	7.10±0.240 7.340

MICROBIAL LIMIT TESTS

Table 04: Results of Microbial Contamination Test

S.No.	Test Particulars	Colony Counts (CFU/ g)	Limits Value (CFU/g)
1.	Total Viable Aerobic Bacterial Count	2×10^2	1×10^5
2.	Total Viable Fungal Count	No growth	1×10^3

The Results of the microbiological analysis for microbial contamination of the drug **Pattai Chooranam** was given in Table 04. The total viable aerobic bacterial counts on Nutrient agar plate was 2×10^2 CFU / g and the fungal count on SDA agar plates was No growth. The results were found to comply with the specification limit for total bacterial count i.e. NMT 1×10^5 CFU/ml and total fungal count i.e. NMT 1×10^3 CFU/ml.

Table 05: Results of Specific Pathogens Test

S.No.	Test for Specified Pathogens	Colony Counts (CFU/ g)
1.	*Salmonella* sp.	No growth
2.	*Staphylococcus aureus*	No growth
3.	*Escherichia coli*	No growth
4.	*Pseudomonas aeruginosa*	No growth

The analytical screening of sample showed in Table 05 that **the product is free from** specific pathogen like *Escherichia coli*, *Salmonella, Pseudomonas aeruginosa* and *Staphylococcus aureus.*

BIOCHEMICAL ANALYSIS

The preliminary biochemical analysis was done and the results are tabulated below.

Table 06: Qualitative analysis of biochemical parameters of Pattai chooranam

S.NO	Biochemical Substances	Presence/Absence
1	Calcium	+
2	Sulphate	+
3	Chloride	_
4	Carbonate	_
5	Starch	+
6	Phosphate	_
7	Albumin	_
8	Tannic acid	_
9	Unsaturated compound	+
10	Reducing sugar	+
11	Amino acid	+
12	Zinc	_
13	Iron (Ferrous)	+
14	Iron (Ferric)	_

From Table.06 it can be seen that the test drug contains **Calcium, Sulphate, Starch, Unsaturated compound, Reducing sugar, Amino acid and Ferrous iron.**

PHYTO-CHEMICAL ANALYSIS

This experimental study was taken up to qualitative analysis of Phyto-chemicals in this drug Pattai Chooranam using various test and the results are exhibited in Table No.07

Table 07: Incidence of various phyto-chemicals in Pattai Chooranam (PC)

S.No	Name of Tests Conducted	Result Observed
Observation of Alkaloids		
1.	Mayer's Test	Negative
2.	Dragendroff's Test	Negative
3.	Hager's Test	Negative
Observation of Carbohydrates and Glycosides		
4.	Molisch Test	Positive
5.	Legal's Test	Negative
6.	Borntrager's Test for anthraquinones	Negative
Observation of Phytosterols		
7.	Liebermann – Burchard Test	Negative
8.	Salkowski Test	Negative
Observation of Flavanoids		
9.	Shinoda Test (Magnesium turnings & Hydrochloric acid)	Negative
10.	Fluorescence Test	Negative
Observation of Tannins		
11.	Ferric chloride test	Negative
12.	Potassium dichromate test	Positive
13.	Lead acetate test	Positive
	Observation of proteins	
14.	Mi Millon's test	Negative
15.	Biuret test	Negative
16.	Ninhydrin test	Negative
Observation of fixed oils and fats		
17.	Spot test	Negative

18.	Saponification test	Negative
Observation of Lignin		
19.	Phloroglucinol test	Negative
Observation of Saponins		
20.	Frothing test	Negative

Note: *Positive indicates the presence of Phytochemical; Negative indicates the absence of Phytochemical*

The preliminary analysis showed the presence of **Tannins and Glycosides.**

QUANTITATIVE ANALYSIS

FTIR ANALYSIS

F TIR analysis of the Pattai chooranam is shown below.

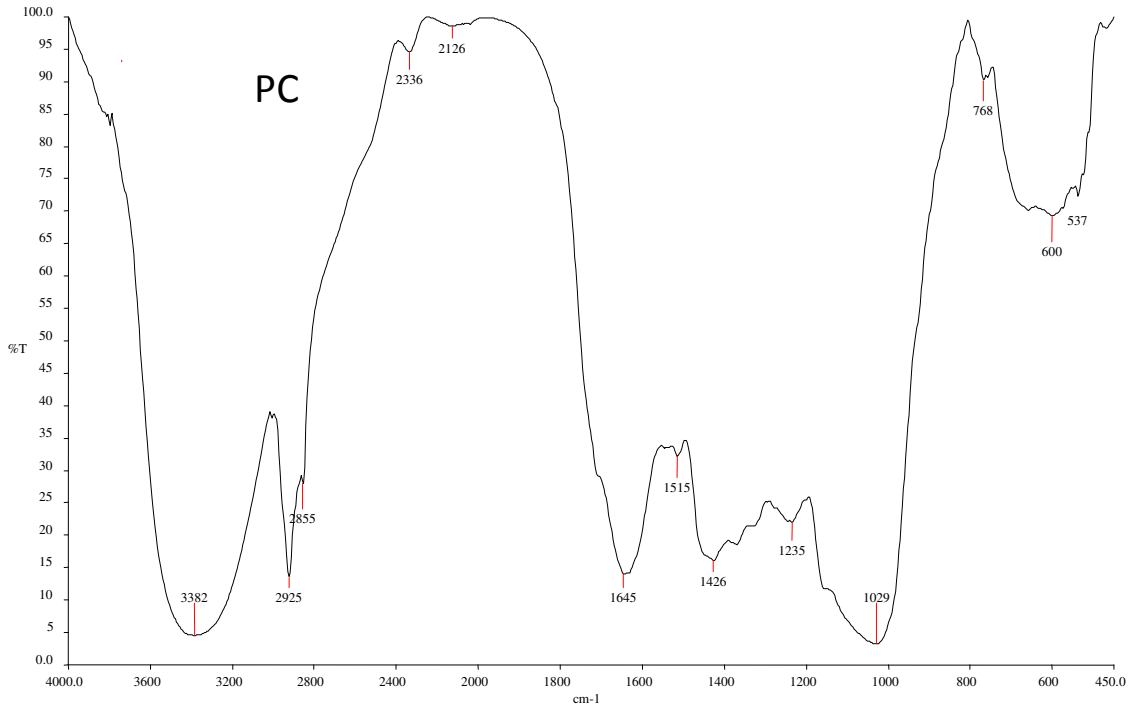


Figure 5: FTIR analysis of Pattai chooranam

Table 08: Results of FTIR analysis of Pattai chooranam

Frequency, cm^{-1}	Bond	Functional group
3382	O – H stretch	Alcohols
2925	C – H stretch	Alkenes
2855	C – H stretch	Alkenes
2126	C (triple bond) C-H:C-H bend	Alkynes
1645	N-H bend	Primary amines
1515	C=C stretch	Aromatics
1426	C=C stretch	Aromatics
1235	C-N stretch	Aliphatic amines
1025	C-N stretch	Aliphatic amines
768	N-H	Primary, secondary amines
600	C-Cl stretch	Alkyl halides
537	C-Br stretch	Alkyl halides

The FTIR has proven to be a valuable tool for the characterization and identification of functional groups present in the Pattai chooranam.

The above table shows the presence of **alcohols, phenols, alkenes, carboxylic acids, amines, aliphatic amines, aromatic and alkyl halides groups.**

PERKIN ELMER OPTIMA 5300 DV ICP-OES

Sample ID: PC - (wt: 0.36126g)

Table 09: ICP-OES Report of PC

Elements Symbol	Wavelength (nm)	Concentration
Al	396.152	BDL
As	**188.979**	**BDL**
Ca	315.807	102.180 mg/L
Cd	**228.802**	**BDL**
K	766.491	113.821 mg/L
Mg	285.213	01.104 mg/L
Hg	**253.652**	**BDL**
Na	589.592	104.320 mg/L
Cu	**327.393**	**BDL**
Ni	231.604	BDL
Pb	**220.353**	**BDL**
P	213.617	186.341 mg/L
S	180.731	01.254 mg/L

< BDL – Below detection limit, PC - PATTAI CHOORANAM>

The results reveal that **Below Detection Level** (BDL) of Al, As, Cd, Hg, Cu, Ni and Pb. And result indicates the presence of P, K, Na, Ca, S and Mg in order of higher to lower concentration.

XRD ANALYSIS

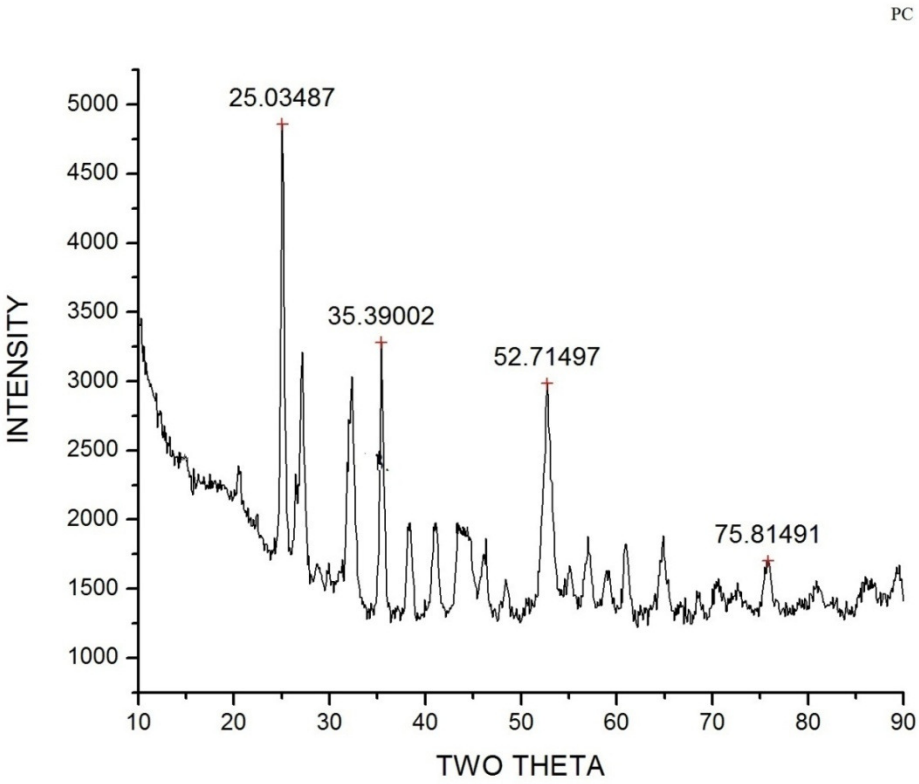


Figure 6: XRD analysis of Pattai Chooranm.

QUANTITATIVE CHEMICAL EVALUATION BY POWDER XRD OF PATTAI CHOORANAM

XRD is used for analysis of the amount of the major classes of active constituents. X-ray powder diffractometry (XRD) is used to analyse different minerals, crystalline materials and metallic based herbal formulations. The herbal drug Pattai Chooranam was estimated by XRD and the intense sharp diffraction peaks (25, 35, 52, 75.) clearly confirmed the presence of high crystallinity in Pattai Chooranam. X-ray powder Diffraction data confirmed the formation of herbal organic complex molecules.

SEM ANALYSIS

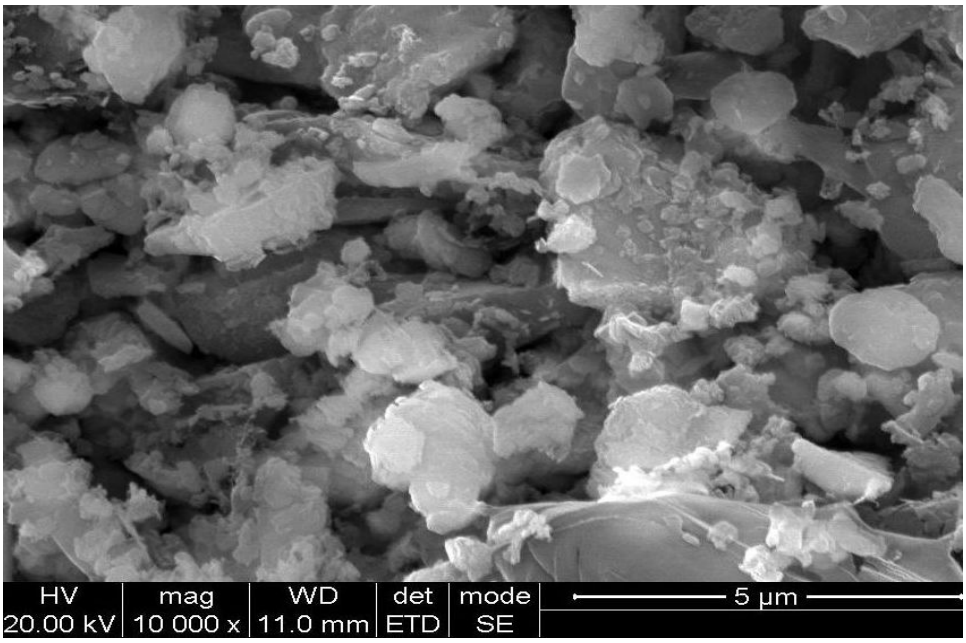


Figure 7: SEM analysis of pc in mag: 10,000, WD 11.0mm

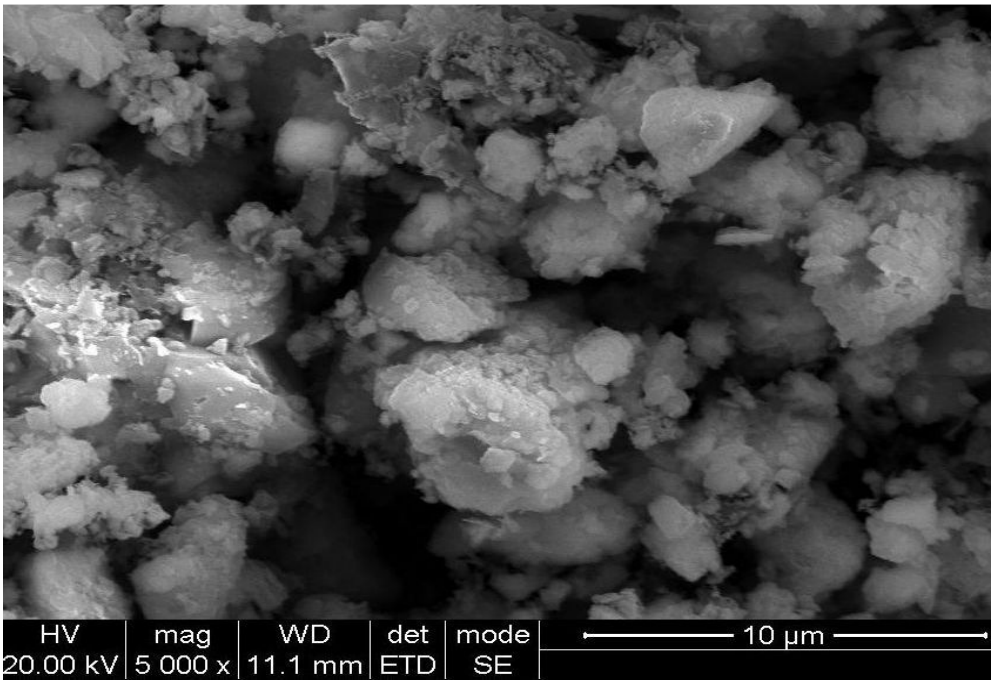


Figure 8: SEM analysis of Pattai chooranam mag: 5,000, WD 11.1mm

Observed from SEM photographs that particles are spherical in shapes and sizes are in the range from 0.5micron to 5microns.

OBSERVATION OF ANIMAL RESPONSES

ACUTE TOXICITY STUDY

The drug was administered with different concentrations in six groups (5mg/kg, 50mg/kg, 300mg/kg, 1000mg/kg & 2000mg/kg) and Group I which was kept as a normal control was administered only with water. The animals were observed carefully for first 24 hours and any changes in behavior were noted. The results of this study is tabulated in Tables 10-17.

Table 10: Acute response after oral administration of water in Group I (Control)

Observation	At 1 hr	At 3 hrs	At 4 hrs	At 24 hrs
Sedation	-	-	-	-
Hypnosis	-	-	-	-
Convulsion	-	-	-	-
Ptosis	-	-	-	-
Analgesis	-	-	-	-
Stupor reaction	-	-	-	-
Motor activity	-	-	-	-
Muscle relaxant	-	-	-	-
CNS stimulant	-	-	-	-
CNS depressant	-	-	-	-
Pilo erection	-	-	-	-
Skin colour changes	-	-	-	-
Lacrimation	-	-	-	-
Stool consistency	-	-	-	-

+ Presence of particular symptom, - absence of particular symptom

Table 11: Acute response after oral administration of test drug in Group II (5mg/kg body weight)

Observation	At 1 hr	At 3 hrs	At 4 hrs	At 24 hrs
Sedation	-	-	-	-
Hypnosis	-	-	-	-
Convulsion	-	-	-	-
Ptosis	-	-	-	-
Analgesis	-	-	-	-
Stupor reaction	-	-	-	-
Motor activity	-	-	-	-
Muscle relaxant	-	-	-	-
CNS stimulant	-	-	-	-
CNS depressant	-	-	-	-
Pilo erection	-	-	-	-
Skin colour changes	-	-	-	-
Lacrimation	-	-	-	-
Stool consistency	-	-	-	-

+ Presence of particular symptom, - absence of particular symptom

Table 12: Acute response after oral administration of test drug in Group III (50mg/kg body weight)

Observation	At 1 hr	At 3 hrs	At 4 hrs	At 24 hrs
Sedation	-	-	-	-
Hypnosis	-	-	-	-
Convulsion	-	-	-	-
Ptosis	-	-	-	-
Analgesis	-	-	-	-
Stupor reaction	-	-	-	-
Motor activity	-	-	-	-
Muscle relaxant	-	-	-	-
CNS stimulant	-	-	-	-
CNS depressant	-	-	-	-
Pilo erection	-	-	-	-
Skin colour changes	-	-	-	-
Lacrimation	-	-	-	-
Stool consistency	-	-	-	-

+ Presence of paticular symptom, - absence of particular symptom

Table 13: Acute response after oral administration of test drug in Group IV (300mg/kg body weight)

Observation	**At 1 hr**	**At 3 hrs**	**At 4 hrs**	**At 24 hrs**
Sedation	-	-	-	-
Hypnosis	-	-	-	-
Convulsion	-	-	-	-
Ptosis	-	-	-	-
Analgesis	-	-	-	-
Stupor reaction	-	-	-	-
Motor activity	-	-	-	-
Muscle relaxant	-	-	-	-
CNS stimulant	-	-	-	-
CNS depressant	-	-	-	-
Pilo erection	-	-	-	-
Skin colour changes	-	-	-	-
Lacrimation	-	-	-	-
Stool consistency	-	-	-	-

+ Presence of particular symptom, - absence of particular symptom

Table 14: Acute response after oral administration of test drug in Group V (1000/kg body weight)

Observation	At 1 hr	At 3 hrs	At 4 hrs	At 24 hrs
Sedation	-	-	-	-
Hypnosis	-	-	-	-
Convulsion	-	-	-	-
Ptosis	-	-	-	-
Analgesis	-	-	-	-
Stupor reaction	-	-	-	-
Motor activity	-	-	-	-
Muscle relaxant	-	-	-	-
CNS stimulant	-	-	-	-
CNS depressant	-	-	-	-
Pilo erection	-	-	-	-
Skin colour changes	-	-	-	-
Lacrimation	-	-	-	-
Stool consistency	-	-	-	-

+ Presence of particular symptom, - absence of particular symptom

Table 15: Acute response after oral administration of test drug in Group VI (2000mg/kg body weight)

Observation	At 1 hr	At 3 hrs	At 4 hrs	At 24 hrs
Sedation	-	-	-	-
Hypnosis	-	-	-	-
Convulsion	-	-	-	-
Ptosis	-	-	-	-
Analgesis	-	-	-	-
Stupor reaction	-	-	-	-
Motor activity	-	-	-	-
Muscle relaxant	-	-	-	-
CNS stimulant	-	-	-	-
CNS depressant	-	-	-	-
Pilo erection	-	-	-	-
Skin colour changes	-	-	-	-
Lacrimation	-	-	-	-
Stool consistency	-	-	-	-

+ Presence of particular symptom, - absence of particular symptom

Table 16: Home cage activity

Functional and behavioural observation	Observation	Control Group I	5 mg/kg Group II	50 mg/kg Group III	300 mg/kg Group IV	1000 mg/kg Group V	2000 mg/kg Group VI
		Female	Female	Female	Female	Female	Female
		N=3	N=3	N=3	N=3	N=3	N=3
Body position	N	3	3	3	3	3	3
Respiration	N	3	3	3	3	3	3
Clonic involuntary Movement	N.B	3	3	3	3	3	3
Tonic involuntary movement	N.B	3	3	3	3	3	3
Palpebral closure	N.B	3	3	3	3	3	3
Approach response	N	3	3	3	3	3	3
Touch response	N	3	3	3	3	3	3
Pinna reflex	N	3	3	3	3	3	3
Tail pinch response	N	3	3	3	3	3	3

N – Normal, N.B- Normal behavior.

Table 17 : Hand held observation

Functional and behavioural observation	Observation	Control Group I	5mg/kg Group II	50mg/kg Group III	300mg/kg Group IV	1000mg/kg Group V	2000mg/kg Group VI
		Female N=3	Female N=3	Female N=3	Female N=3	Female N=3	Female N=3
Reactivity	Normal	3	3	3	3	3	3
Handling	Normal	3	3	3	3	3	3
Palpebral closure	Normal Behaviour	3	3	3	3	3	3
Lacrimation	Normal Behaviour	3	3	3	3	3	3
Salivation	Normal Behaviour	3	3	3	3	3	3
Piloerection	Normal Behaviour	3	3	3	3	3	3
Pupillary reflex	Normal	3	3	3	3	3	3
Abdominal tone	Normal	3	3	3	3	3	3
Limb tone	Normal	3	3	3	3	3	3
Number of animals dead- No mortality							

RESULT OF ACUTE TOXICITY STUDY:

From the above data it is clear that the drug did not show any symptom of acute toxicity in wistar rats. No mortalities were noted all through the study. As it is practicall difficult to administer more than 2000mg/kg body weight in wistar albino rats, further increase in dosage was not attempted. Since no mortality of animals is noted in the administered doses, LD_{50} could not be calculated from this study. But the drug is found to be safe upto 2000mg/kg body weight in wistar rats.

SUBACUTE TOXICITY STUDY

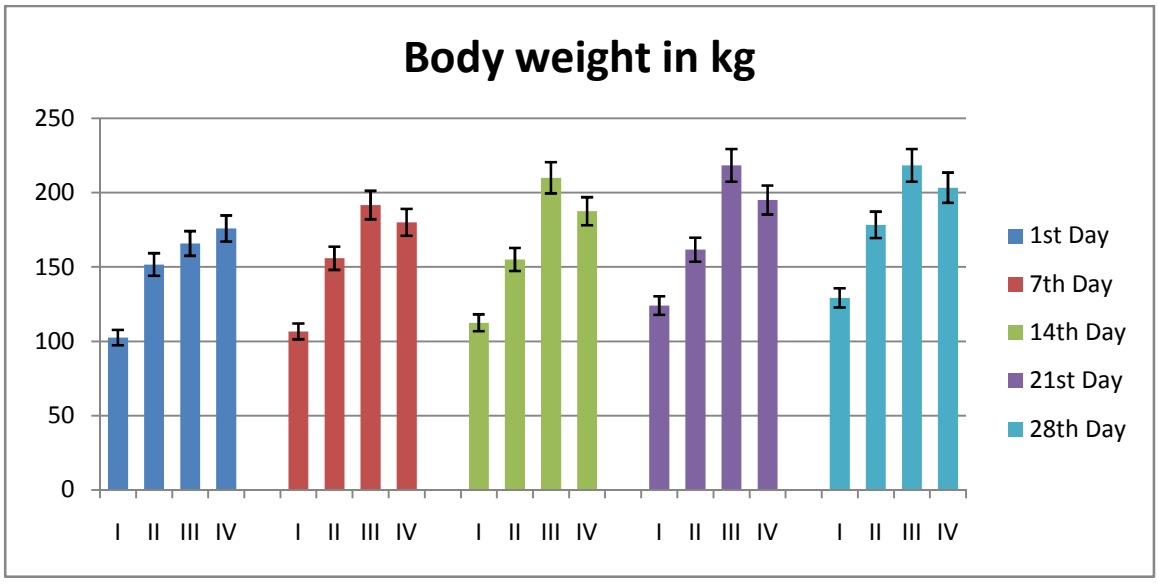
Subacute toxicity study was done for a period of 28 days. Drug was administered once a day for 28 days with three different Concentrations.

Table 18: Body weight changes in subacute toxicity study

Groups	Drug Treatment	Body Weight(gm)				
		1st Day	7th Day	14th Day	21st Day	28th Day
I	Control (1ml/kg, p.o)	102.5 ±7.6	106.66 ±8.02	112.5 ±9.01	124.06 ±10	129.16 ±9.34
II	PC (300mg/kg)	151.66 ±17.77	155.83 ±14.04	155 ±9.03	161.66 ±5.86	178.33 ±4.21
III	PC (600mg/kg)	165.83 ±21.69	191.66 ±14.06	210 ±5.62	218.33 ±4.21	218.33 ±7.92
IV	PC (1200mg/kg)	175.83 ±13.92	180 ±16.68	187.5 ±10.38	195 ±10.38	203.33 ±6.54

Values are in mean ± SEM (n=6), PC-Pattai Chooranam.

Chart 1: Body weight changes in subacute toxicity study



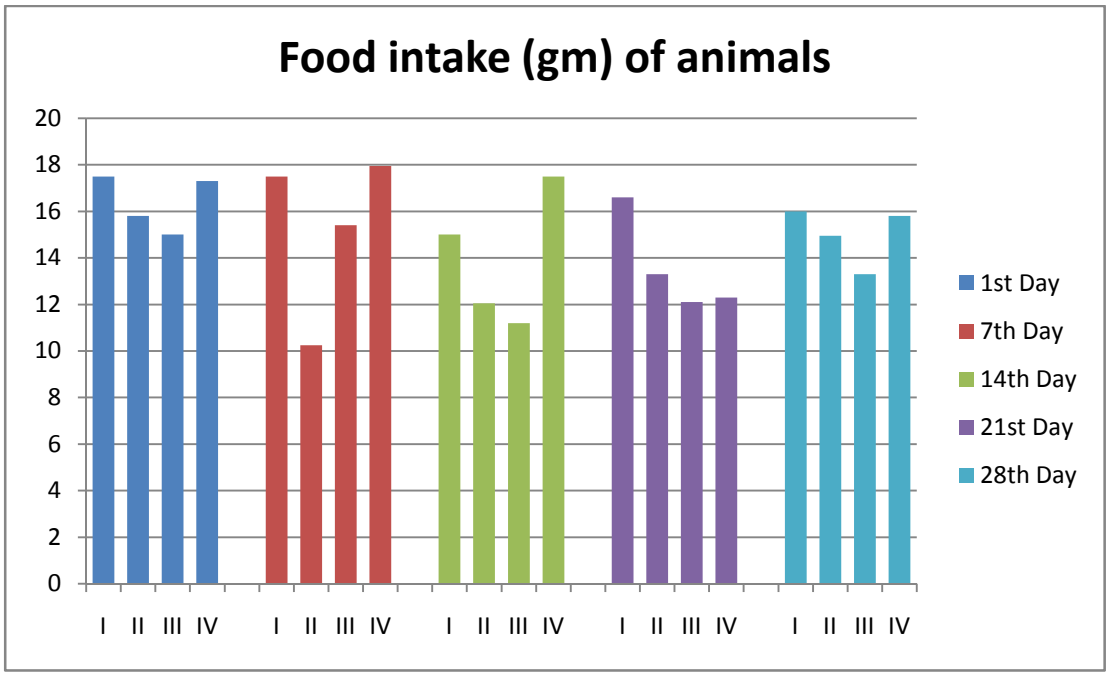
EFFECT OF TEST DRUG ON FOOD INTAKE

Table 19: Food intake in subacute toxicity study

Groups	Drug Treatment	Food Intake(gm)				
		1st Day	7th Day	14th Day	21st Day	28th Day
I	Control (1ml/kg, p.o)	17.5	17.5	15	16.6	16
II	PC(300mg/kg)	15.8	10.25	12.05	13.3	14.95
III	PC(600mg/kg)	15	15.4	11.2	12.1	13.3
IV	PC(1200mg/kg)	17.3	17.95	17.5	12.3	15.8

Values are in mean ± SEM (n=6), PC-Pattai Chooranam.

Chart 2: Food intake in subacute toxicity study



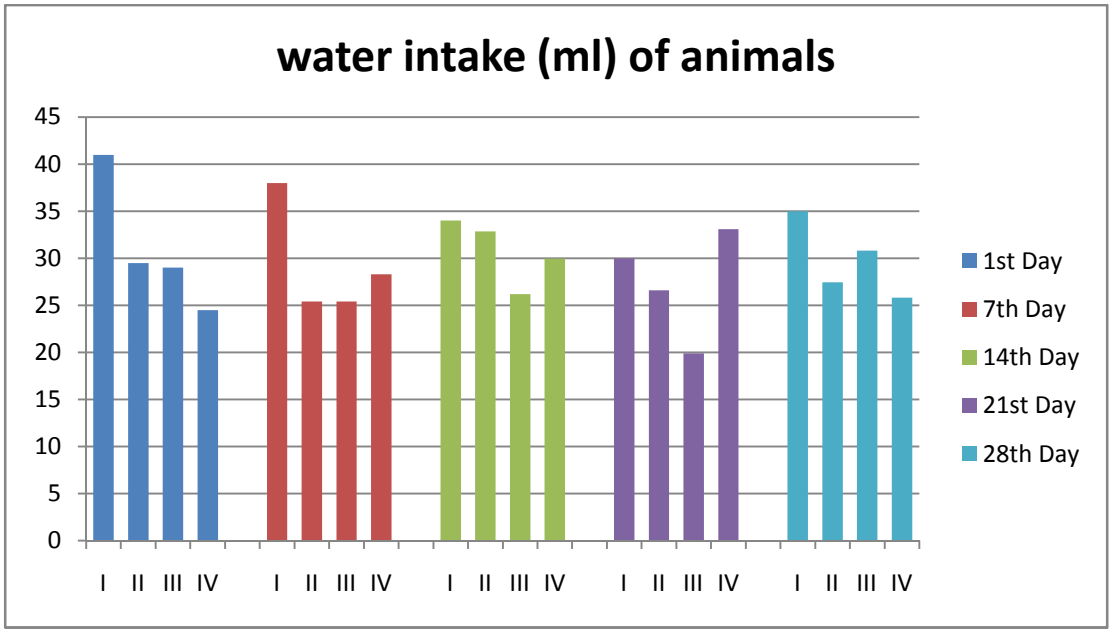
EFFECT OF TEST DRUG ON WATER INTAKE

Table 20: Water intake in subacute toxicity study

Groups	Drug Treatment	Water Intake (ml)				
		1st Day	7th Day	14th Day	21st Day	28th Day
I	Control (1ml/kg, p.o)	41	38	34	30	35
II	PC(300mg/kg)	29.5	25.4	32.85	26.6	27.45
III	PC(600mg/kg)	29	25.4	26.2	19.9	30.8
IV	PC(1200mg/kg)	24.5	28.3	29.95	33.08	25.8

Values are in mean ± SEM (n=6), PC-Pattai Chooranam.

Chart 3: Water intake in subacute toxicity study



Both the control and the drug treated group showed constant weight gain from day 0 to day 28. No notable deviation in terms of body weight, food intake and water intake were observed in both the drug treated groups compared with the normal control.

MORTALITY

All the 24 animals used for the study are alive at the end of the experiment and hence the mortality count is nil.

HEMATOLOGICAL ANALYSIS

Table 21: Total RBC, WBC and Hb in subacute toxicity study

Groups	Drug Treatment	RBC million cells/cu.mm	WBC cells/cu.mm	Haemoglobin gm %
I	Control Vehicle (1ml/kg, p.o)	4.57 ± 0.16	8638.52± 87.66	11.77± 0.28
II	PC 300mg/kg	4.45 ± 0.09	8673.22± 82.17	11.69± 0.25
III	PC 600mg/kg	4.27 ± 0.28	9932.36± 304.73*	11.52± 0.48
IV	PC 1200mg/kg	3.73 ± 0.16*	11679.3± 314.21**	9.41± 0.64*

Values are in mean ± SEM, *= p<0.05, **=p< 0.01, ***=p< 0.001 Vs Control, PC-Pattai Chooranam.

Chart 4: Total RBC in study

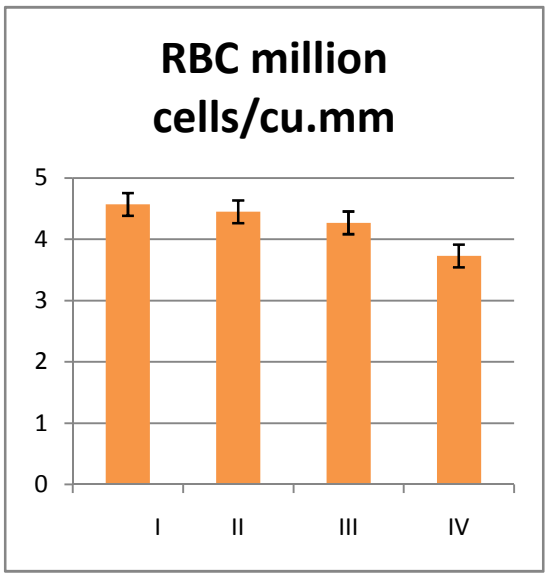


Chart 5: Total Hb in study

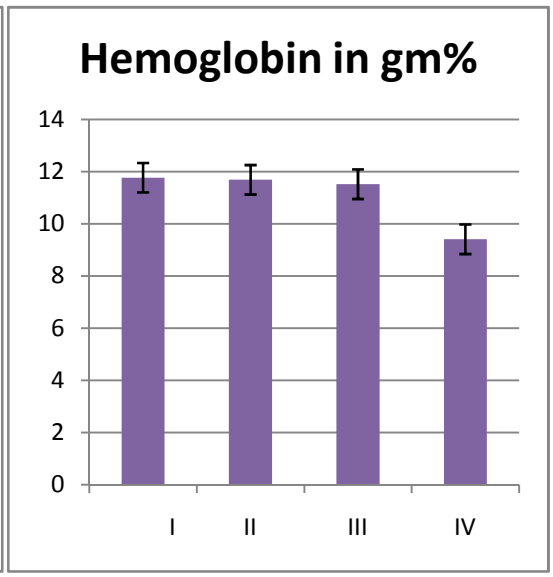
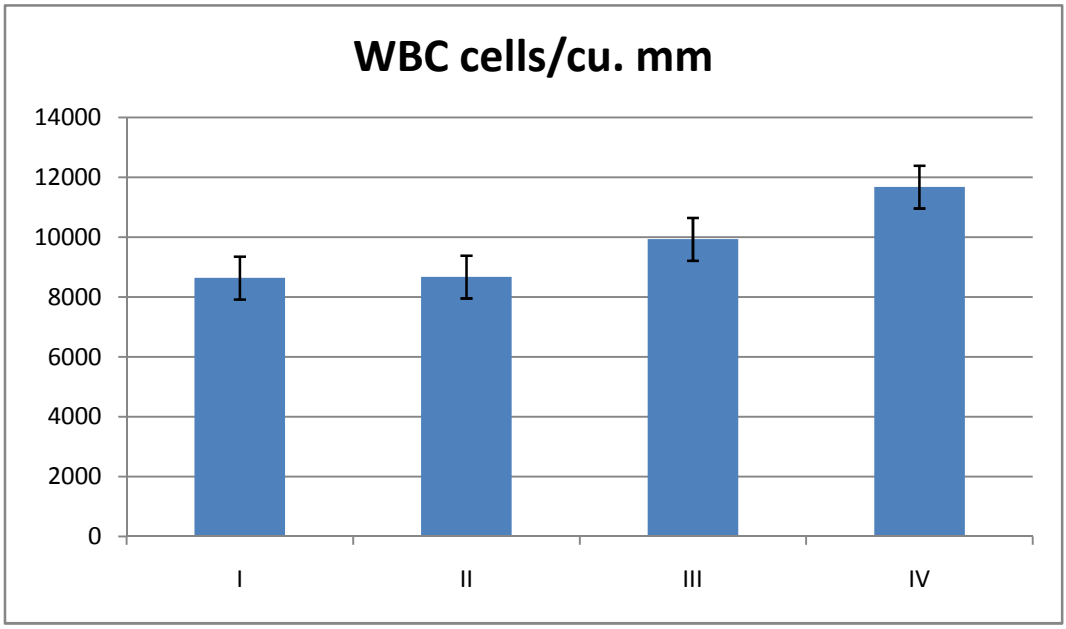


Chart 6: Total WBC in subacute toxicity study



Result:

From the above charts; Pattai Chooranam at 300mg/kg body weight didn't show any significant changes in RBC, WBC and Hb compare to control group.

Pattai Chooranam at 600mg/kg body weight didn't alter the levels of RBC and Hb. But there was significant increase in ($p<0.05$) levels of WBC compare to control group.

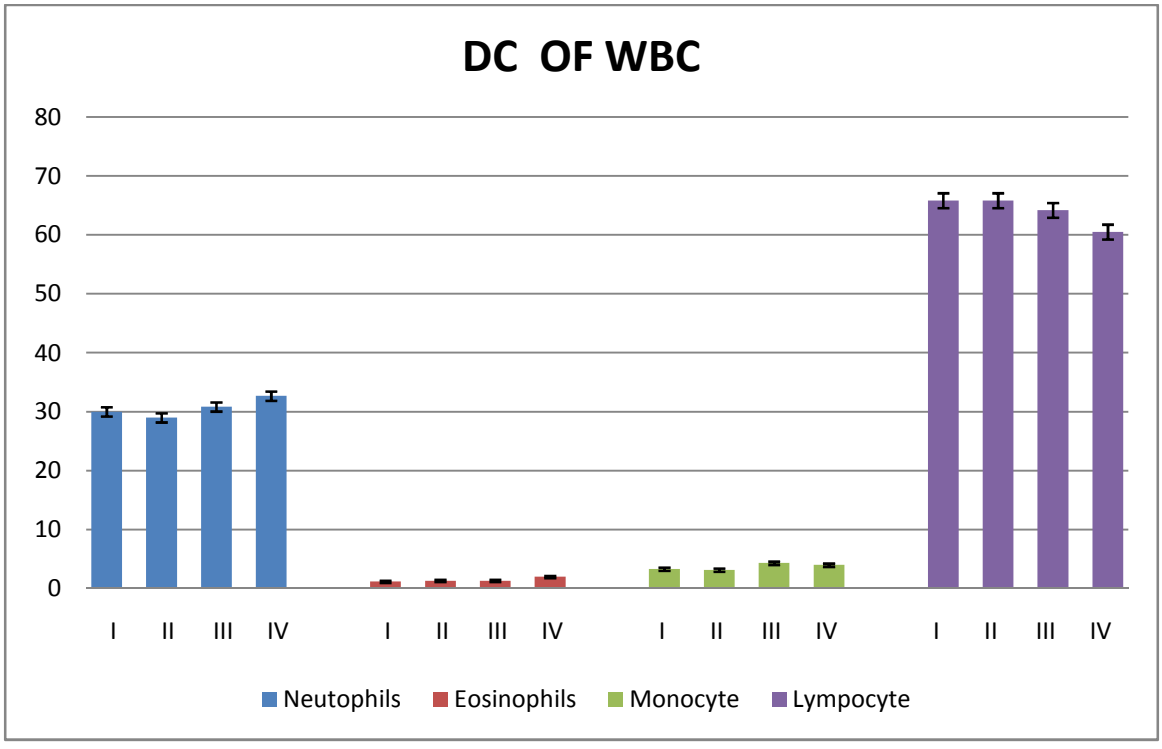
Pattai Chooranam at 1200mg/kg body weight significantly increase the levels of ($p<0.05$) RBC and Hb. Similarly it also significantly ($p<0.01$) increase the level of WBC compare to control group.

Table 22: Differential count of WBC in subacute toxicity study

Groups	Drug Treatment	*Neutophils*	*Eosinophils*	*Monocyte*	*Lympocyte*
I	Control Vehicle (1ml/kg, p.o)	30.00± 1.79	1.17± 0.31	3.33± 0.42	65.83± 1.64
II	PC 300mg/kg	29.00± 0.89	1.33± 0.37	3.17± 0.31	65.83± 2.24
III	PC 600mg/kg	30.83± 0.60	1.33± 0.24	4.33± 0.56	64.17± 1.14
IV	PC 1200mg/kg	32.67± 1.28	2.00± 0.20	4.00± 0.58	60.50± 0.99

Values are in mean ± SEM, *= p<0.05, **=p< 0.01, ***=p< 0.001 Vs Control, PC- Pattai Chooranam.

Chart 7: Total DC of WBC in subacute toxicity study



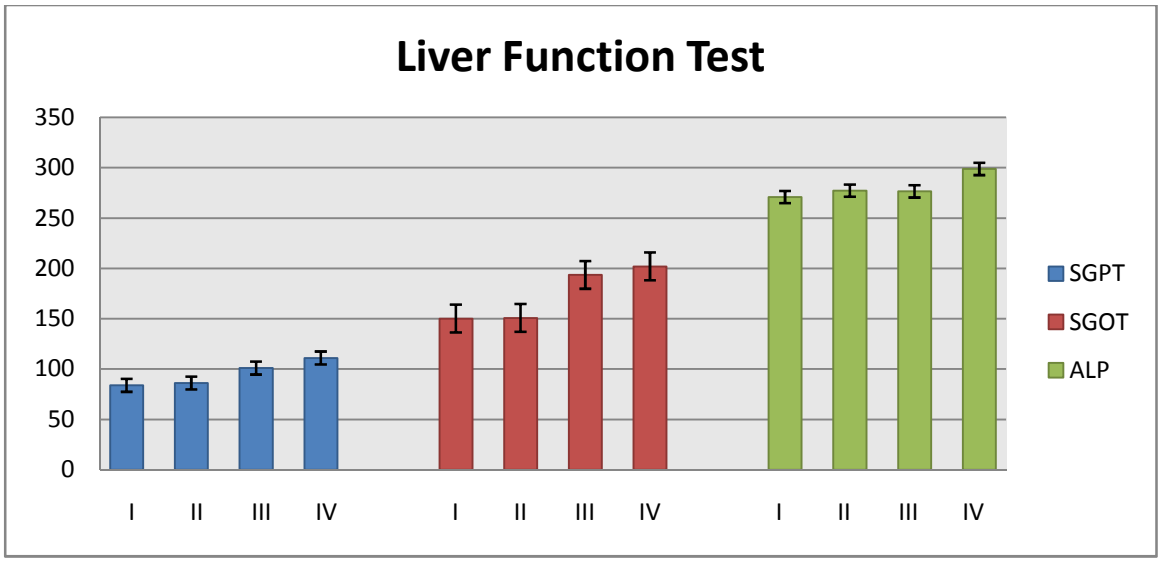
Result: From the above charts; Pattai Chooranam at all doses didn't show any significant changes in Differential count of WBC compare to control group.

Table 23: Liver function test in subacute toxicity study

Groups	Drug Treatment	Liver Function Test		
		SGPT	SGOT	ALP
I	Control Vehicle (1ml/kg, p.o)	83.83± 1.42	150.17±4.59	270.83±4.17
II	PC 300mg/kg	86.17± 3.33	150.83±3.19	277.17±6.79
III	PC 600mg/kg	101.00±2.98	193.50±2.74*	276.50±14.12
IV	PC 1200mg/kg	111.00±5.01*	202.00±6.26**	298.67±5.12*

Values are in mean ± SEM, *= p<0.05, **=p< 0.01, ***=p< 0.001 Vs Control, PC-Pattai Chooranam.

Chart 8: Liver function test in subacute toxicity study



Result:

From the above chart, Group II (300mg/kg body weight) animals didn't show any significant change in SGOT, SGPT and ALP compare to group I (control) animals.

Group III (600mg/kg body weight) animals didn't alter the levels of SGPT and ALP. But there was significant increase in (p<0.05) levels of SGOT compare to group I (control) animals.

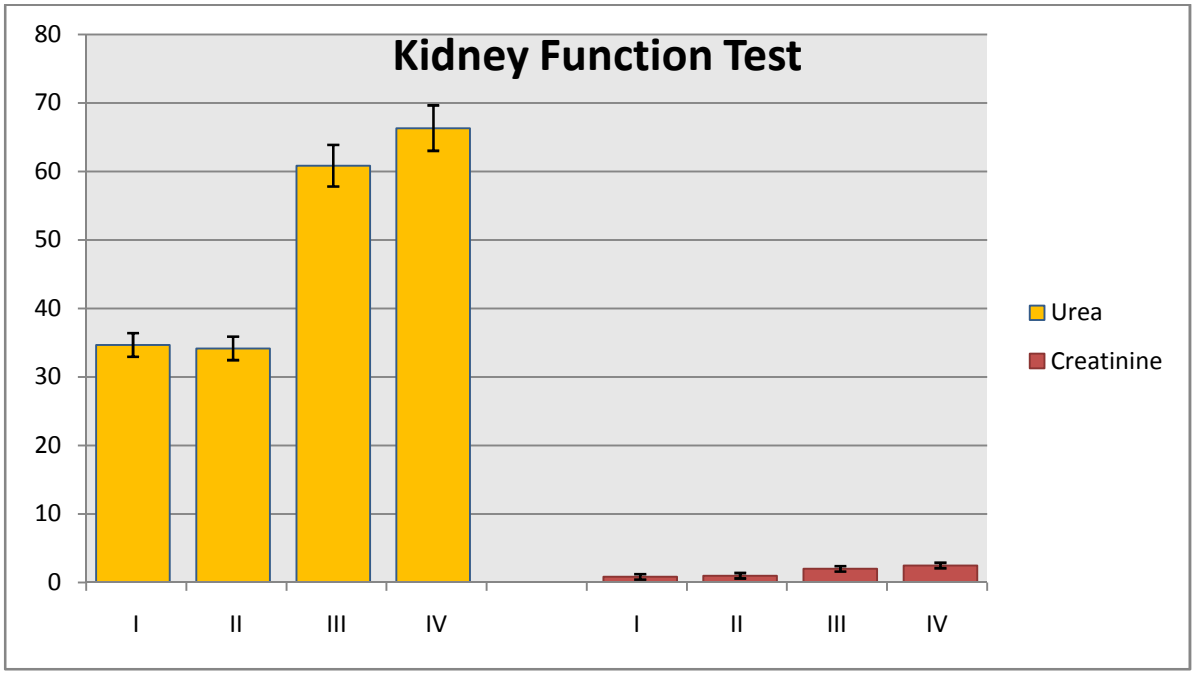
Group IV (1200mg/kg body weight) animals show significantly increase the levels of (p<0.05) SGPT and ALP. Similarly it also significantly (p<0.01) increase the levels of SGOT compare to the group I (control) animals.

Table 24: Kidney function test in subacute toxicity study

Groups	Drug Treatment	Kidney Function Test	
		Urea	***Creatinine***
I	Control Vehicle (1ml/kg, p.o)	34.67±1.12	0.84±0.07
II	PC 300	34.17±1.89	1.00±0.12
III	PC 600	60.83±1.70*	2.01±0.17**
IV	PC 1200	66.33±4.88**	2.49±0.32**

Values are in mean ± SEM, *= p<0.05, **=p< 0.01, ***=p< 0.001 Vs Control,PC-Pattai Chooranam.

Chart 9: Kidney function test in subacute toxicity study



Result:

From the above chart, Group II (300mg/kg body weight) animals didn't show any significant change in Kidney Function Test (Urea and Creatinine) compare to group I (control) animals.

Group III (600mg/kg body weight) animals shows signifantly increase the levels of (p<0.05) Urea. Similarly it also significantly (p<0.01) increase levels of Creatinine compare to group I (control) animals.

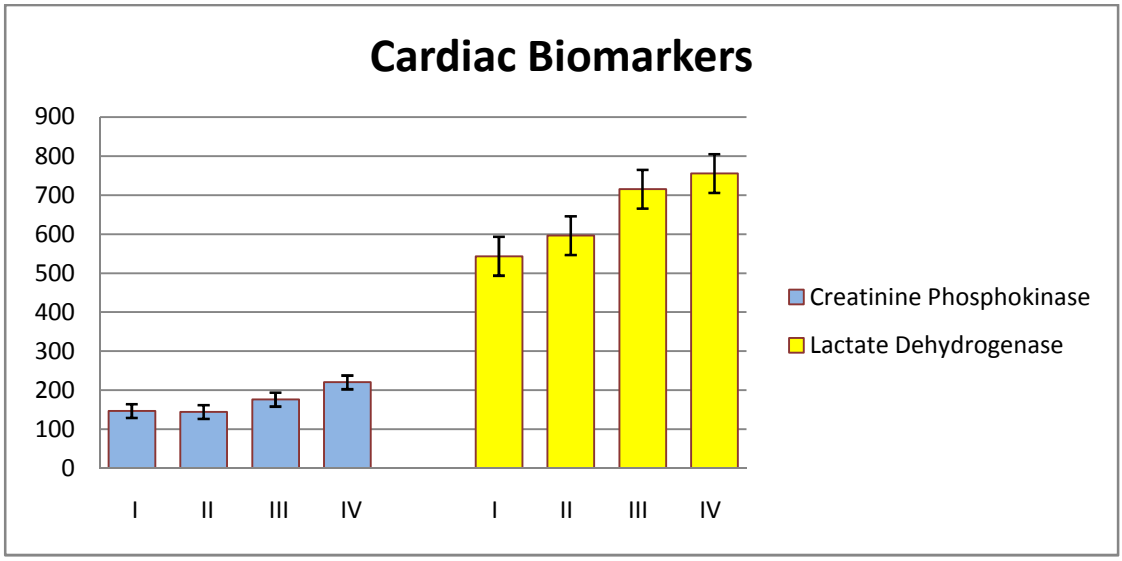
Group IV (1200mg/kg body weight) animals show significantly increase (p<0.01) the levels of Urea and Creatinine compare to Group I (control) animals

Table 25: Cardiac biomarkers in subacute toxicity study

Groups	Drug Treatment	Cardiac Biomarkers	
		Creatinine Phosphokinase	***Lactate Dehydrogenase***
I	Control Vehicle (1ml/kg, p.o)	146.83±4.79	543.50±7.72
II	PC 300	144.67±2.65	596.17±6.87
III	PC 600	176.17±5.37	715.33±5.36**
IV	PC 1200	220.33±8.49**	755.33±11.72**

Values are in mean ± SEM, *= p<0.05, **=p< 0.01, ***=p< 0.001 Vs Control, PC-Pattai Chooranam.

Chart 10: Cardiac biomarkers in subacute toxicity study



Result:

From the above chart, Group II (300mg/kg body weight) animals didn't show any significant change in Cardiac biomarkers (Creatinine Phosphokinase and Lactate Dehydrogenase) compare to group I (Control) animals.

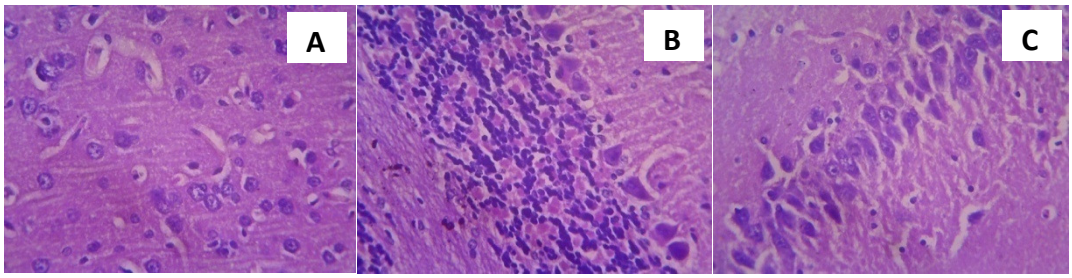
Group III (600mg/kg body weight) animals didn't show significant change in Creatinine Phosphokinase. But, there was showed significant change of increase the levels of ($p<0.01$) Lactate dehydrogenase compare to the group I (control) animals.

Group IV (1200mg/kg body weight) animals show significantly increase the levels of ($p<0.01$) Creatinine Phosphokinase and Lactate dehydrogenase compare to Group I (control) animals.

HISTOPATHOLOGY

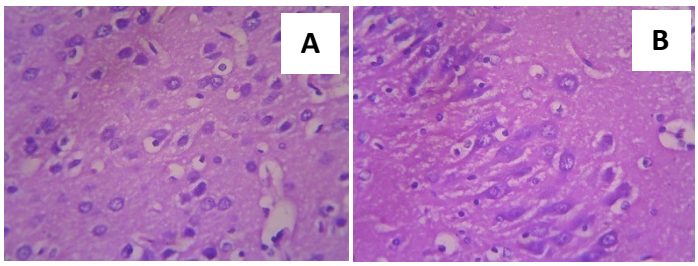
BRAIN:

Group I (Control)



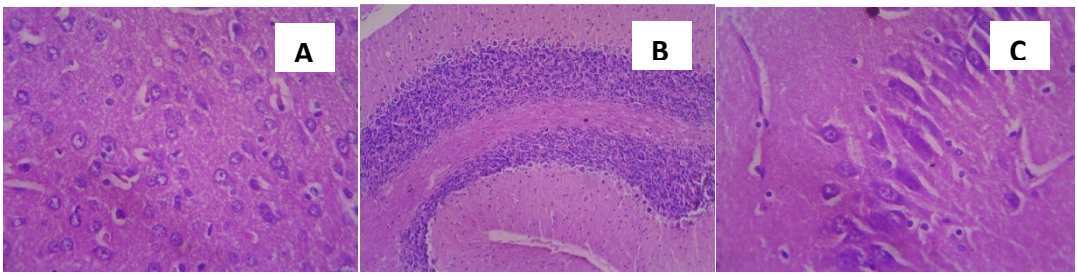
A – Normal Cortex (40x) B- Normal Cerebellum (4ox) C- Normal Hippocampus (40x)

Group II



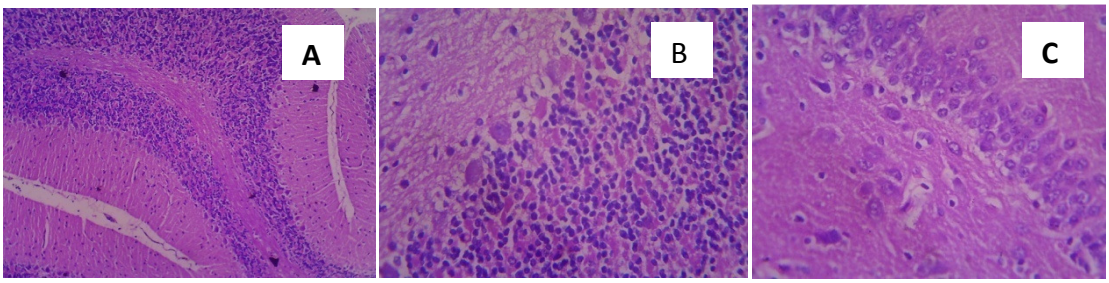
A – Normal Cortex (40x) B- Normal Hippocampus (40x)

Group III



A – Normal Cortex (40x) B- Normal Cerebellum (10x) C- Normal Hippocampus (40x)

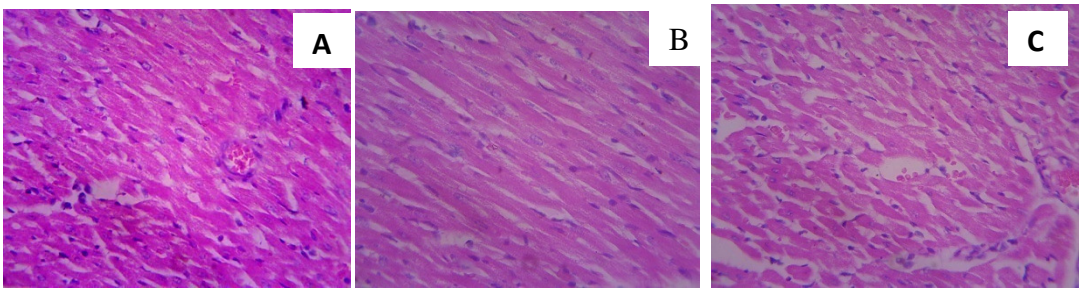
Group IV



A – Normal Cortex (10x) B- Normal Cerebellum (4ox) C- Normal Hippocampus (40x)

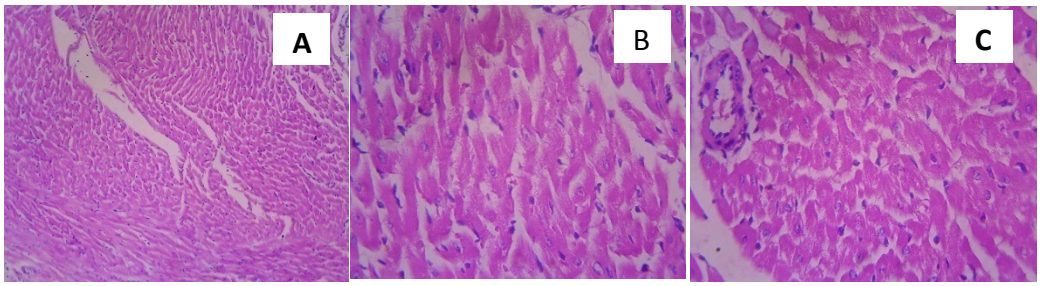
HEART :

GROUP I



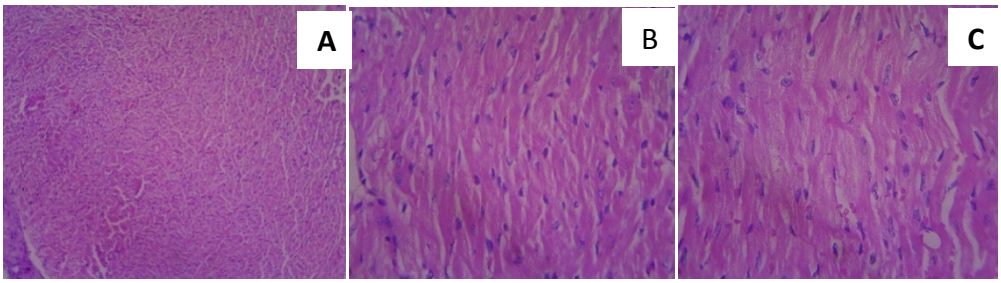
A-Normal Myocardium with myocytes (40x) B- Normal myocardial fibers (40x) C- Normal myocytes (40x)

GROUP II



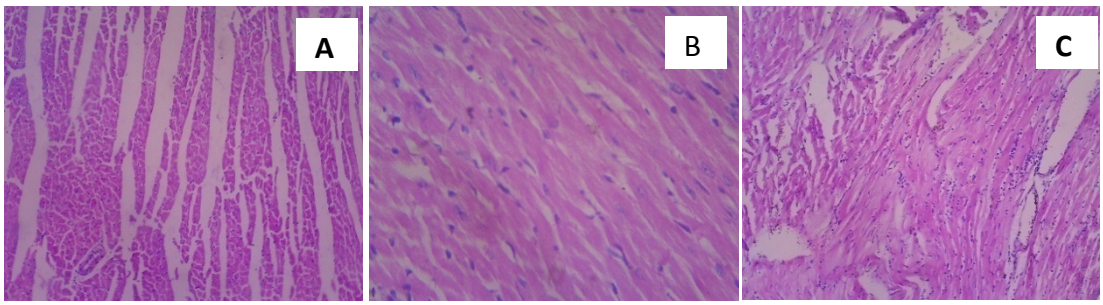
A-Normal Myocardium with myocytes (10x) B- Normal myocardial fibers (40x) C- Normal myocytes (40x)

GROUP III



A-Normal Myocardium with myocytes (10x) B- Normal myocardial fibers (40x) C- Mild degenerations (40x)

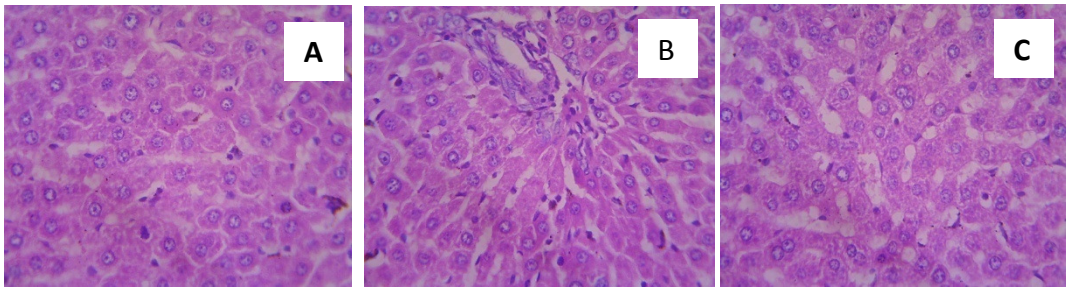
GROUP IV



A-Normal Myocardial fibers with myocytes (40x) B- Normal myocardial fibers (40x) C- Myocardial degenerate with inflammatory infiltrates (10x)

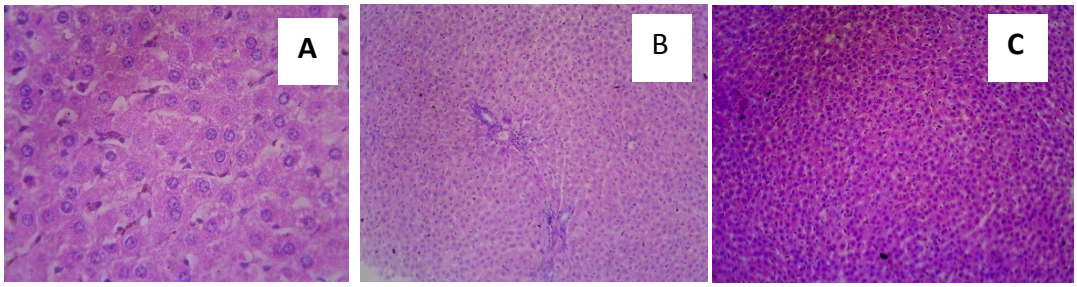
LIVER :

GROUP I



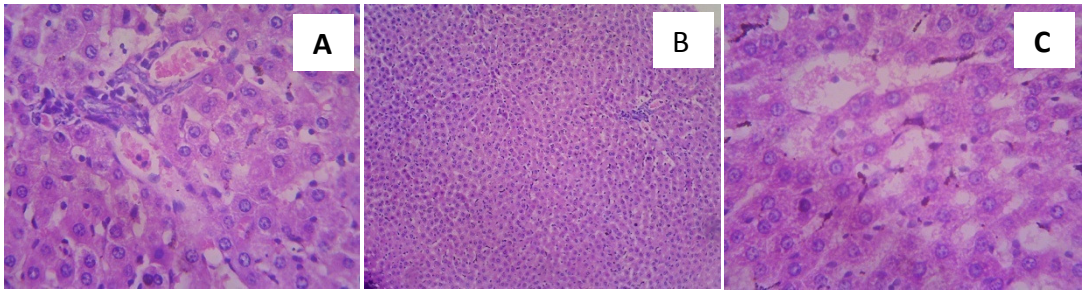
A-Normal Hepatocytes (40x) B- Normal Periportal (40x) C- Normal Sinusoids (40x)

GROUP II



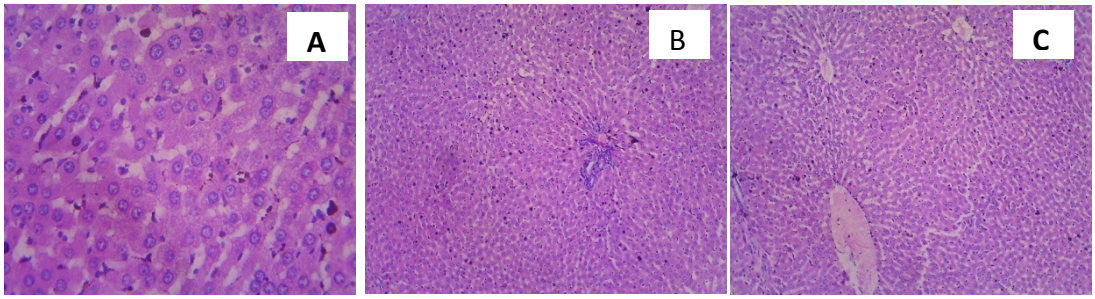
A-Normal Hepatocytes (40x) B- Normal Architecture (10x) C- Normal Lobular architecture (10x)

GROUP III



A- Normal Hepatocytes with portal tract (40x) B-Normal lobular architecture (10x) C- Sinusoidal dilatation (40x)

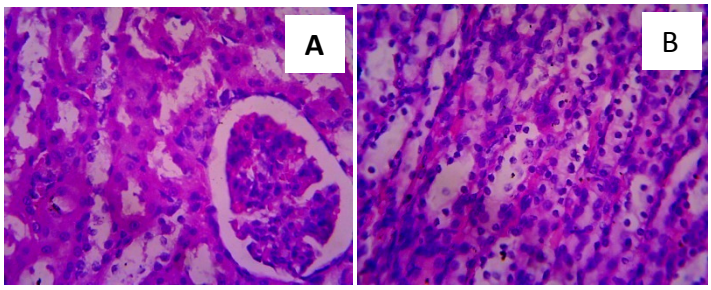
GROUP IV



A-Normal Hepatocytes (40x) B- Normal Lobular architecture with periportal Inflammation (10x) C- Normal Architecture (10x)

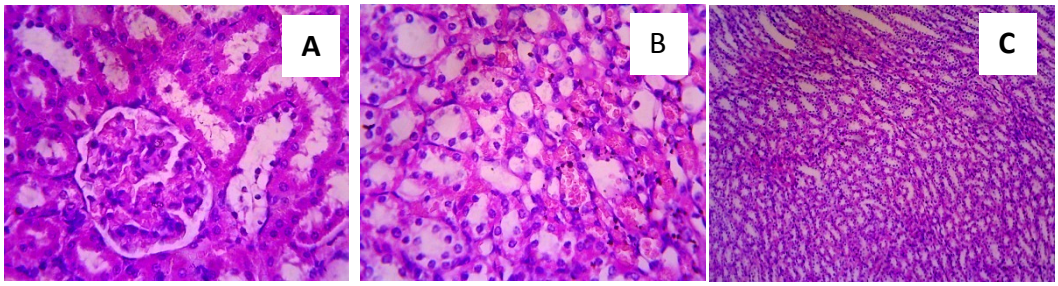
KIDNEY :

GROUP I



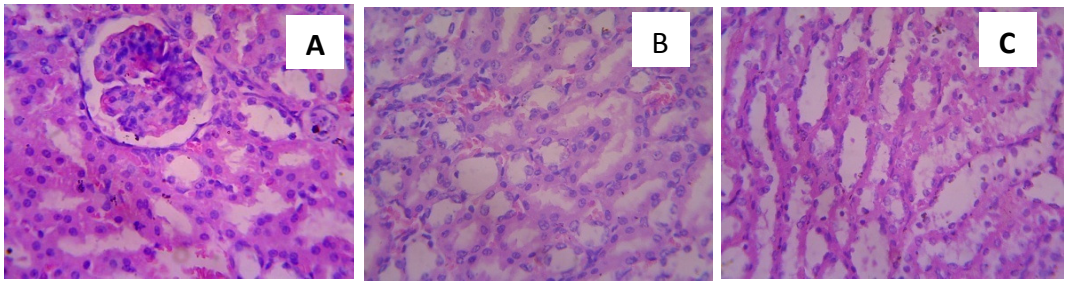
A-Normal Glomeruli and tubules (40x) B- Normal Intestitium (40x)

GROUP II



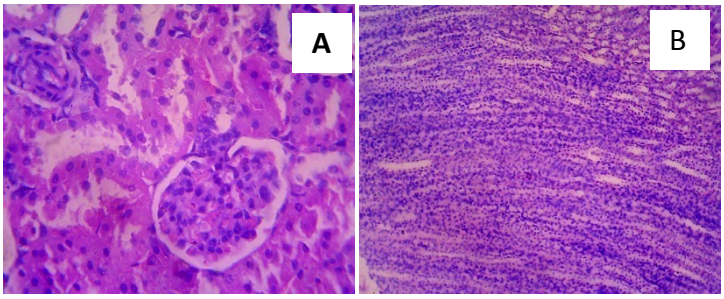
A-Normal Glomeruli and tubules (40x) B- Normal Tubules (40x) C- Normal Intestitium (10x)

GROUP III



A-Normal Glomeruli (40x) B- Normal Tubules (40x) C- Normal Intestitium (40x)

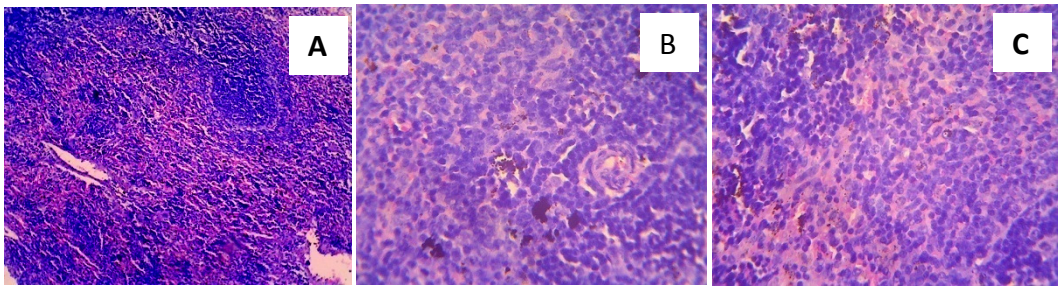
GROUP IV



A-Normal Glomeruli and tubules (40x) B- Normal Intestitium (10x)

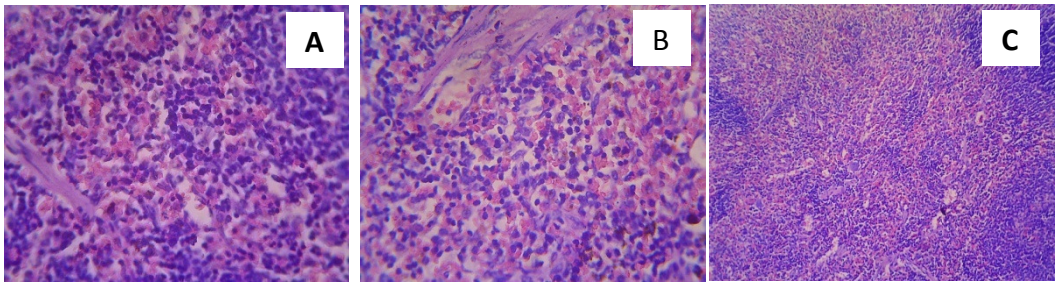
SPLEEN :

GROUP I



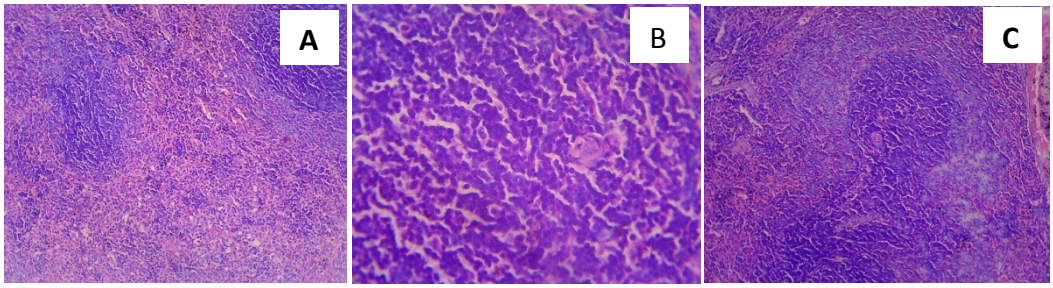
A-Normal Spleen with Red and White Pulp (10x) B- Normal Pencillar artery with white pulp (40x) C- Normal spleen (40x)

GROUP II



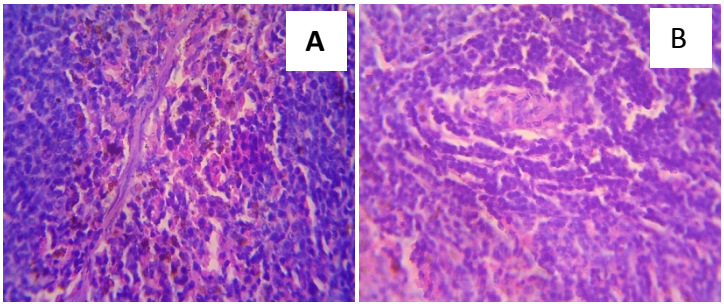
A-Normal White Pulp (40x) B- Normal Pencillar artery (40x) C- Normal Spleen (10x)

GROUP III



A-Normal Spleen with Red and White Pulp (10x) B- Germinal centre formation of Pencillar artery (40x) C- Normal spleen (10x)

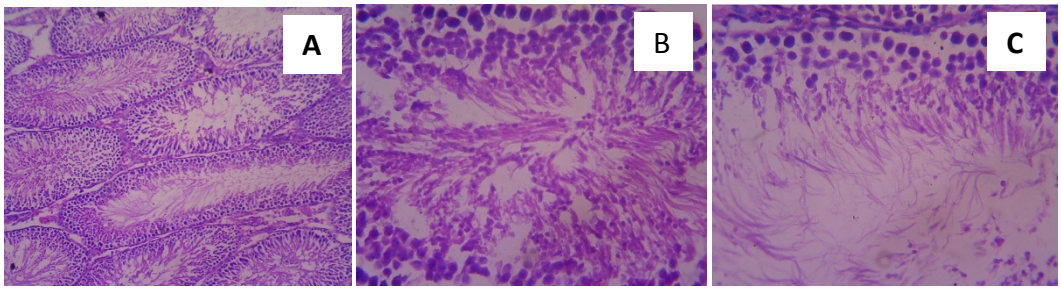
GROUP IV



A-Normal Spleen with Red and White Pulp (40x) B- Normal Pencillar artery with white pulp (40x)

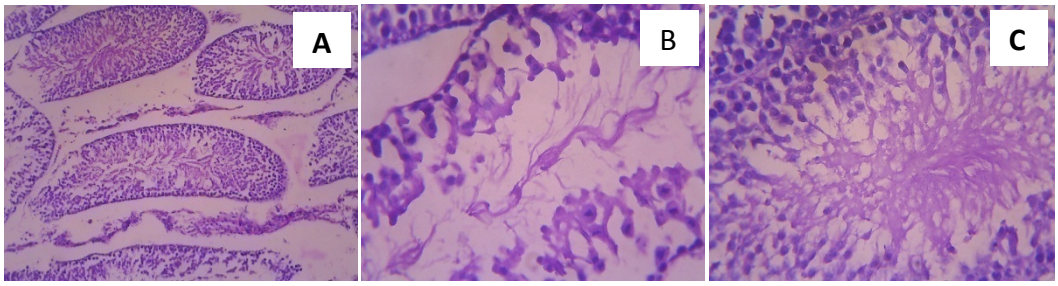
TESTIS :

GROUP I



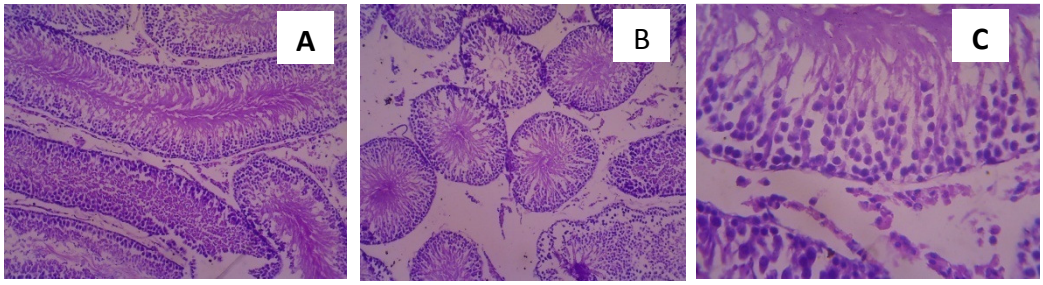
A-Normal Testicular Parenchyma (10x) B- Normal Sperm maturation (40x) C- Normal Spermatogenesis (40x)

GROUP II



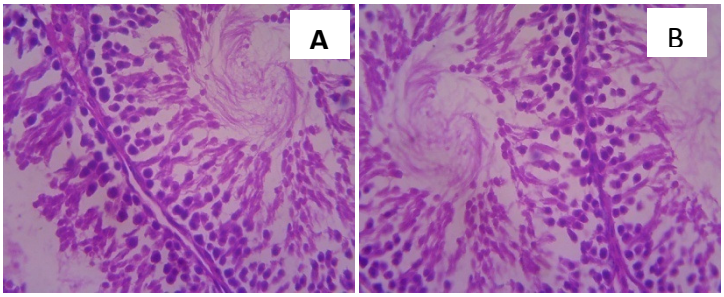
A-Normal Testicular Parenchyma (10x) B- Normal Sperm maturation (40x) C- Normal Spermatogenesis (40x)

GROUP III



A-Interstitial maturation (10x) B- varying stages of maturation (10x) C- Normal Spermatogenesis (40x)

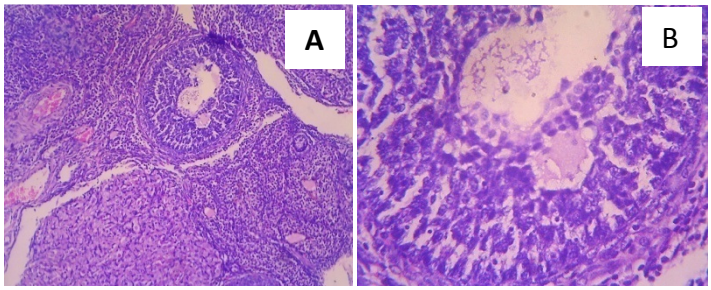
GROUP IV



A- Normal Sperm maturation (40x) B- Normal Spermatogenesis (40x)

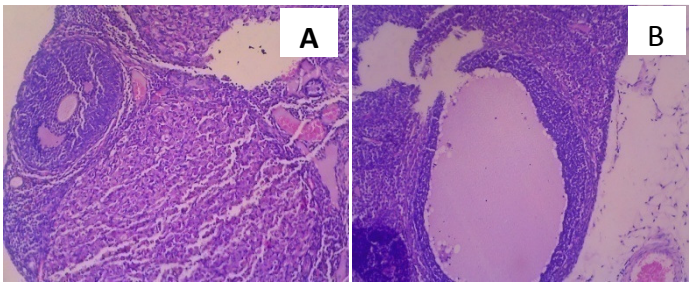
OVARY :

GROUP I



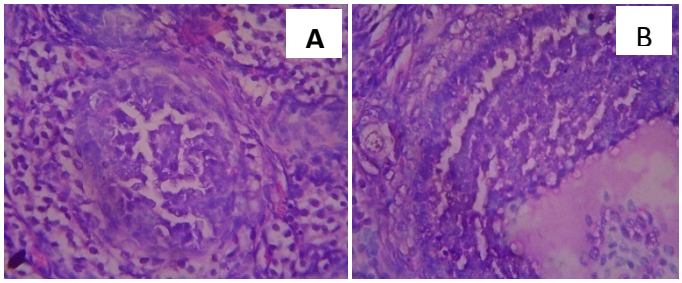
A-Oocytes in the center (10x) B- Ovarian follicle (40x)

GROUP II



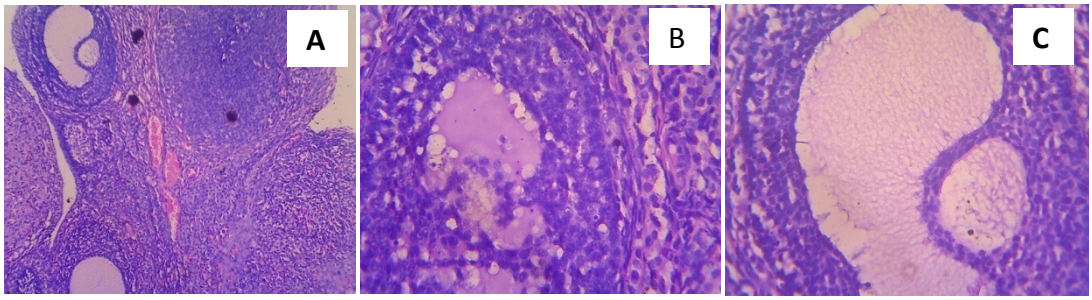
A-Ovary with varying sizes of ovarian follicles (10x) B- Ovarian follicle (40x)

GROUP III



A-Ovarian stroma (40x) B- Ovarian follicle (40x)

GROUP IV



A-various sizes of ovarian follicles (10x) B- Ovarian follicle (40x) C- Ovary (40x)

BIOSTATISTICAL ASPECTS

Biological assay refers to assessment of the potency of vitamins, hormones, toxicants and drugs of all types by means of the responses produced when doses are given to experimental animals. In every dose response situation, two components must be considered; the Stimulus and the Subject.

The stimulus is applied to the Subject as a stated dose namely concentration, weight, time or appropriate measure. The subject manifest a response, the level of intensity below which the threshold. But the term tolerance is now widely accepted.

MEDICAN EFFECTIVE DOSE (E.D.50)

It is the dose which produces the desired response in half the animal population tested.

MEDIAN LETHAL DOSE (L.D 50)

It is the dose which kills half the population of the animal tested.

LD50 Measurement (Toxicity)

- If the test compound shows any pharmacological activity then the LD50 of the drug is determined.
- By determining the LD50, we can justify whether to proceed with the drug or not.

Table-26: Acute Toxicity Study Analysis

Group	Dose in mg/kg	No. of rats	No. of rats died
I Control	Distilled Water (1ml/kg)	3	-
II	5	3	-
III	50	3	-
IV	300	3	-
V	1000	3	-
VI	2000	3	-

Since there was no mortality of the animal in acute toxicity study, lethal dose of drug could not be calculated.

Table-27: Sub-acute Toxicity Study Analysis

Group	Dose (mg/kg)	No.of rats Both sex	Days	No. of rats died
I	Control	6(3M+3F)	28	-
II	300	6(3M+3F)	28	-
III	600	6(3M+3F)	28	-
IV	1200	6(3M+3F)	28	-

M-Male, F- Female.

In case of Sub-acute toxicity study, with the help of physiological parameters such as Haematological investigations and with the Histopathological studies the drug reaction within the animal can be assessed and are being tabulated respectively.

Lethal dose of **"PATTAI CHOORANAM"** can be calculated with higher dose level of the drug which can be done in further studies.

6. DISCUSSION

The present study with PATTAI CHOORANAM was conducted with an objective to find out whether this drug has got any side effects or adverse reactions in short and Long term administration.

The total viable aerobic bacterial counts on Nutrient agar plate was 2 x 10^2 CFU / g and the fungal count on SDA agar plates was No growth. The results were found to comply with the specification limit for total bacterial count i.e. NMT 1× 10^5 CFU/ml and total fungal count i.e. NMT 1× 10^3 CFU/ml (Protocol for testing Ayurveda, Siddha and Unani medicines).

The **product is free from specific pathogen** like *Escherichia coli*, *Salmonella, Pseudomonas aeruginosa* and *Staphylococcus aureus.*

Biochemical analysis of PATTAI CHOORANAM indicates the presence of **Calcium, Sulphate, Starch, Unsaturated compound, Reducing sugar, Amino acids and Ferrous Iron.**

Phytochemical analysis of PATTAI CHOORANAM indicates the presence of **Glycosides and Tannins**.

FTIR analysis of the PATTAI CHOORANAM indicates the presence of **alcohols, phenols, alkenes, carboxylic acids, amines, aliphatic amines, aromatic, and alkyl halides groups.**

In ICP-OES of PATTAI CHOORANAM shows **Below Detection Level** (BDL) of Al, As, Cd, Hg, Cu, Ni and Pb result indicates the presence of P, K, Na, Ca, S and Mg.

The herbal drug PATTAI CHOORANAM was estimated by XRD and the intense sharp diffraction peaks (25, 35, 52 and 75) clearly confirmed the presence of high crystallinity in PATTAI CHOORANAM. X-ray powder Diffraction data confirmed the formation of herbal organic complex molecules.

SEM analysis indicated that the particle size were in Range **0.5 – 5µ micron**.

On the basis of acute toxicity study Results the study shows that PATTAI CHOORANAM **did not produce any toxic effect** up to the dose of **2000mg/kg** body weight of animal.

On the basis of sub acute toxicity study Results reveal that PATTAI CHOORANAM did not cause either any lethality or adverse changes with general

behavior of rats and also there were no observable detrimental effects in 300mg/kg, 600mg/kg and 1200mg/kg body weight over a period of 28 days.

In Histopathological interpretations explained that the group II (300mg/kg body weight) animals didn't show any variation in Brain, Heart, Liver, Kidney, Spleen and Testis & Ovary compare to Group I (Control) animals.

In Group III and Group IV (600mg/kg & 1200mg/kg body weight) animals shows mild changes in Liver (Sinusoidal Dilatation and Peri-portal Inflammation respectively) and mild degeneration changes observed in Heart of female animals only.

In Group III and Group IV (600mg/kg & 1200mg/kg body weight animals didn't show any variations in Brain, Kidney, Spleen and Testis & Ovary.

In hematological analysis; PATTAI CHOORANAM at Group II (300mg/kg body weight) didn't show any significant changes in RBC, WBC, Hb and in Group III (600mg/kg body weight) animals didn't alter the levels of RBC and Hb. But there was significant increase ($p<0.05$) level of WBC compare to group I (control) animals. And in Group IV (1200mg/kg body weight) animals significantly increase the levels of ($p<0.05$) RBC and Hb. Similarly it also significantly ($p<0.01$) increase the level of WBC compare to Group I (control) animals.

In Liver function test reported; From the Table: 23, Group II (300mg/kg body weight) animals didn't show any significant changed in SGOT, SGPT and ALP.

Group III (600mg/kg body weight) animals didn't alter the level of SGPT and ALP. But there was significant increase ($p<0.05$) level of SGOT compare to Group I (control) animals.

Group IV (1200mg/kg body weight) animals show significantly increase the levels of ($p<0.05$) SGPT and ALP. Similarly it also significantly ($p<0.01$) increase the level of SGOT compare to the Group I (control) animals.

In Kidney function test showed as; From the Table: 24, Group II (300mg/kg body weight) animals didn't show any significant change in Kidney Function Tests (Urea and Creatinine).

Group III (600mg/kg body weight) animals showed significantly increase the level of ($p<0.05$) Urea. Similarly it also significantly ($p<0.01$) increase the level of Creatinine compare to Group I (control) animals.

Group IV (1200mg/kg body weight) animals showed significantly increase ($p<0.01$) the levels of Urea and Creatinine compare to Group I (control) animals.

In Cardiac Biomarkers revealed as; From the Table: 25; Group II (300mg/kg body weight) animals didn't show any significant change in Cardiac biomarkers (Creatinine Phosphokinase and Lactate Dehydrogenase) compare to Group I (Control) animals.

Group III (600mg/kg body weight) animals didn't show significant change in Creatinine Phosphokinase. But there was significantly increase the levels of ($p<0.01$) Lactate dehydrogenase compare to the group I (control) animals.

Group IV (1200mg/kg body weight) animals showed significantly increase the levels of ($p<0.01$) Creatinine Phosphokinase and Lactate dehydrogenase compare to Group I (control) animals.

These results indicate that PATTAI CHOORANAM did not produce any adverse effects and changes in the organ up to 300mg/kg body weight (Group II) animals.

They did not produce any mortality in 600mg/kg body weight (Group III) and 1200mg/kg body weight (Group IV) animals. But histopathological and hematological changes were occurred.

7. SUMMARY

The medicine PATTAI CHOORANAM was taken for the dissertation work based on Anuboga Vaidya Navaneetham, Part IX, 1975, Pg. no: 59.

The aim of this dissertation was to study the acute and sub-acute toxicity effect of the medicine PATTAI CHOORANAM administered at various presumed several dosages in the experimental animals.

The ingredients of PATTAI CHOORANAM were; Parangipattai, Nellikai Ganthagam Sathikai, Sathipathiri, Lavangam, Sirunagapoo, Amukkara Kizhangu, Kodiveli Verpattai, Sadamanjil, Pachai Karpooram. The samples were procured from Tirunelveli Town, Tirunelveli.

The drug was analysed for its physicochemical properties and contents by using qualitative biochemical analysis and modern techniques such as ICP-OES, FTIR and XRD.

Depending upon the results of this analysis the contents of test sample was identified.

By Scanning Electron Microscope (SEM) the size of the particles about 0.5 - 5µ micron.

The raw samples were taken for purification and the test medicine was prepared, as per method narrated in the literature.

The study was conducted at Nandha College of Pharmacy, Erode.

To evaluate the acute toxicity study 18 Wistar Albino Rats were selected and divided into 6 groups (Group I Control II, III, IV, V, VI) and they were administered with the drug with different graded doses ranging from Control Group (Distilled Water) 1ml/kg, 5mg/kg, 50mg/kg, 300mg/kg, 1000mg/kg and 2000mg/kg Body weight of animal orally. Daily the animals were observed for clinical signs and mortality. The drug did not produce any mortality and it is safe up to 2000mg/kg body weight.

Sub-acute toxicity study was conducted for about 28 day duration. No signs of toxicity were observed in animals from different dose groups during the dosing period of 28 days.

The blood samples were taken prior to sacrifice. The blood samples were sent to laboratory for haematological evaluation. No significant Haematological changes

occurred in Group II (300mg/kg body weight) animals. But changes occurred in Group III (600mg/kg body weight) and Group IV (1200mg/kg body weight) animals.

Both the control and the drug treated group showed constant weight gain from day 0 to day 28. No notable deviation in terms of body weight, food intake and water intake were observed in both the drug treated groups compared with the normal control.

There were no remarkable histopathologicl changes in Group II (300mg/kg body weight) animals. But Mild changes occurred in liver (Male and Female) and heart (Female) in Group III and IV (600mg/kg body weight and 1200mg/kg body weight) animals.

By Acute and Sub-acute toxicity studies, the drug PATTAI CHOORANAM is found to be safe up to 300mg/kg body weight.

Further studies needed the dose above 300mg/kg body weight for the long period as sub chronic and Chronic toxicity studies.

8. CONCLUSION

The PATTAI CHOORANAM was prepared using traditional literature sources and it was characterized by using various analytical techniques with PLIM guidelines. Finally it was assessed the safety of PATTAI CHOORANAM in acute and sub-acute toxicity studies through animal experiments.

From the acute toxicity study it was observed that the administration of PATTAI CHOORANAM up to the dose of 2000mg/kg body weight of animal did not produced drug related toxicity and mortality. So No-Observed-Adverse-Effect-Level (NOAEL) of PATTAI CHOORANAM is 2000mg/kg body weight.

In sub-acute toxicity study found Hematological and Histopathological changes in 600mg/kg and 1200mg/kg body weight (Group III and IV) of anmials and in the dose 300mg/kg bodyweight (Group-II) of animals did not produced any Hematological and Histopathological changes. Therefore Pattai Chooranam can be significantly safe up to the dose 300mg/kg body weight in oral administration for a long term.

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